COMMERCE, JUSTICE, SCIENCE, AND RELATED AGENCIES APPROPRIATIONS FOR FISCAL YEAR 2016

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

NONDEPARTMENTAL WITNESSES

[CLERK'S NOTE.—The subcommittee was unable to hold hearings on nondepartmental witnesses. The statements and letters of those submitting written testimony are as follows:]

PREPARED STATEMENT OF THE AMERICAN GEOPHYSICAL UNION

The American Geophysical Union (AGU), a non-profit, non-partisan scientific society, appreciates the opportunity to submit testimony regarding the fiscal year 2016 budget request for the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), and the National Science Foundation (NSF). The AGU, on behalf of its over 60,000 Earth and space scientist members, respectfully requests that the 114th Congress appropriate:

—$18.91 billion overall for NASA, $5.51 billion for the Science Mission Directorate;
—$5.98 billion overall for NOAA; and
—$7.72 billion overall for NSF.

NATIONAL AERONAUTICS & SPACE ADMINISTRATION

AGU requests that Congress appropriate $18.91 billion for NASA in fiscal year 2016. Additionally, AGU requests that Congress appropriate $5.51 billion for NASA's Science Mission Directorate. These increases represent a 5 percent increase over the fiscal year 2015 appropriated levels.

Despite increases in appropriation, NASA's budget has fallen in real dollars by 10.5 percent since fiscal year 1995. Unless this pattern is reversed, NASA will cede its leadership in the Earth and space science missions and exploration that the U.S. has historically pioneered. A request of 5 percent allows NASA to grow above the rate of inflation.

Within NASA's Science Mission Directorate, AGU requests that Congress set appropriations for the Earth, Planetary, and Heliophysics Divisions that are equitable and in harmony with their respective Decadal studies produced by the National Research Council.

Earth Science and Planetary Science Divisions

Missions within NASA's Earth Science Division aid in flood prediction, earthquake response, and severe storm tracking. Greater knowledge and prediction skills are urgent when we consider the effort, time and costs of protecting infrastructure along coasts, rebuilding fish populations in our seas, developing new water resources for manufacturing and agriculture, and restoring communities in the wake of hazards. These observations, and many others like them, are integral and require the vantage point of outer space.

NASA's Planetary Science Division advances our understanding of the solar system and inspires future generations of scientists. However, with no outer planet missions currently in early-stage development and barring any major funding increase, the U.S. will soon relinquish its presence beyond Mars.

Both areas of science, Earth and planetary, are complementary. The study of the Earth system—Earth's interacting physical, chemical, and biological processes—informs our understanding of other worlds in the solar system, and our exploration of these bodies advance our knowledge of Earth's evolution.

Heliophysics Science Division

Studying the sun and its interactions with Earth is crucial to increasing our knowledge of the dynamic solar processes that impact all life on our planet. This includes advance detection and warning of space weather events, such as solar storms, that have the potential to cause serious damage to our satellites, energy grid infrastructure, and the electronics we depend everyday. The request would ensure continued growth in NASA's work researching these and other interactions between the Sun and the Earth.

NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION

AGU requests that Congress appropriate $5.98 billion for NOAA in fiscal year 2016. This would be a 9.8 percent increase over the fiscal year 2015 appropriated level for NOAA.

In our 21st century economy, it is vital that NOAA provide the data and insights on our environment that keep Americans safe and prosperous. NOAA's atmospheric and oceanic programs combine cutting-edge research and world-class operational facilities to ensure that the U.S. is a resilient, weather-ready, and sustainable nation. Many sectors of our economy rely on the Agency's satellite programs to provide high quality, uninterrupted data for weather forecasts and on its oceanic program for insights on our environment and the sustainability of our coastal economies.

NATIONAL SCIENCE FOUNDATION

AGU requests that Congress appropriate $7.72 billion for NSF in fiscal year 2016. This would be a 5.2 percent increase over the fiscal year 2015 appropriated level for NSF.

The Foundation is critical to America's ability to compete globally in technological and scientific innovation. Faced with ever-increasing international competition, maintaining U.S. scientific leadership requires continued robust investments in basic research and STEM education. NSF is the only Federal agency that supports research and education across all fields of science, engineering, and mathematics and at all educational levels. Research and education programs supported by NSF help increase and develop the knowledge base needed for pushing the frontiers of science, mathematics, and engineering disciplines, contribute to the development of the future science and technology workforce, underpin new fields of inquiry, and promote interdisciplinary research and education. All of these facilitate technological innovation.

Even under tight budget constraints, it is important for NSF to have steady budget levels that demonstrate real growth. Under constant 2014 dollars, NSF has lost 5.8 percent of its budget from fiscal year 2010 to fiscal year 2014. This stagnant pace of funding is creating an innovation deficit in the U.S.—a widening gap between the actual level of Federal Government funding for research and higher education and what the investment needs to be if the U.S. is to remain the world's innovation leader.

Geosciences Directorate

The Geoscience Directorate awards research in the Earth, atmospheric, ocean, and polar sciences. Much of the geosciences research budget leads to a better understanding of critical national needs, such as water and mineral resources, energy resources, environmental issues, climate change, and mitigation of natural hazards. AGU asks the subcommittee to strongly support these programs.

GEO supports infrastructure, operation, and maintenance costs for cutting edge facilities that are essential for fundamental and applied research. Geoscience-based research tools and academic expertise helped to track and contain the BP *Deepwater Horizon* oil spill, saving billions of dollars for Gulf industries and untold costs to the environment. Among the major infrastructure that NSF supports, the U.S. Arctic and Antarctic Facilities and Logistics, Academic Research Fleet, EarthScope Operations, Incorporated Research Institutions for Seismology (IRIS), the Ocean Drilling Program, the Ocean Observatories Initiative, and the National Center for Atmospheric Research are all key to our Nation's innovation and economic well-being. AGU strongly supports robust and steady funding for this infrastructure as well as operation and maintenance of these major facilities.

Earth Science Education

The geosciences workforce is aging and being quickly depleted. Congress can grow this workforce, stimulate economic growth in the energy, natural resources and environmental sectors, and improve natural resource literacy by supporting the full integration of Earth science information into mainstream science education at the K–12 and higher education levels. AGU strongly supports the new NSF INCLUDES program (Inclusion Across the Nation of Communities of Learners that have been Underrepresented for Diversity in Engineering and Science), the Integrated NSF Support Promoting Interdisciplinary Research and Education program (INSPIRE), the Graduate Research Fellowships (GRF), and the Research Experiences for Undergraduates (REU), and the Faculty Early Career Development Program (CAREER). These programs are effective in building a science and engineering workforce for the 21st century that supports academia, industry, national defense, and Federal and local governments.

PREPARED STATEMENT OF THE AMERICAN GEOSCIENCES INSTITUTE

Thank you for this opportunity to provide the American Geosciences Institute's perspective on fiscal year 2016 appropriations for geoscience programs within the subcommittee's jurisdiction.

The American Geosciences Institute (AGI) supports critical Earth Science research conducted by the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), the National Institute of Standards and Technology (NIST), and the National Aeronautics and Space Administration (NASA). Cutting-edge research on the Earth, energy, and the environment has fueled economic growth, mitigated losses, and improved our quality of life. Our Nation needs skilled and innovative geoscientists to help explore, assess, and develop Earth's resources in a strategic, sustainable, and environmentally sound manner and to help understand, evaluate, and reduce our risks to hazards. *AGI recognizes our Nation's financial challenges and also the necessity for steady growth and investment in science and technology for the future.*

AGI respectfully requests $1.372 billion for the Geoscience Directorate at NSF and $1.947 billion for NASA Earth Science programs. AGI supports the President's request for $5.982 billion for NOAA and $1.12 billion for NIST.

AGI is a nonprofit federation of about 50 geoscientific and professional societies representing more than 250,000 geologists, geophysicists, and other Earth scientists. Founded in 1948, AGI provides information services to geoscientists, serves as a voice for shared interests in our profession, plays a major role in strengthening geoscience education, and strives to increase public awareness of the vital role the geosciences play in society's use of resources, resilience to hazards, and the health of the environment.

NATIONAL SCIENCE FOUNDATION

AGI supports the President's request for $7.724 billion for NSF.—These important investments in the future of our Nation are the seed capital necessary to support the progress of science and engineering which underpins modern society and produces revolutionary—and some as yet unforeseen—breakthroughs. Basic research such as this provides knowledge that is used to improve people's quality of life, creates a dynamic and innovative economy, and strengthens the security of the country.

NSF not only provides core funding and essential infrastructure for basic research, but also supports the education and training of the next generation of the workforce. AGI believes that investment in NSF programs, where research is funded based on competitive, scientific merit and peer review, will pay important dividends in maintaining U.S. dominance in science and technology long into the future.

NSF Geosciences Directorate.—AGI is disappointed that the President's request for a 4.7 percent increase for the Geoscience Directorate (GEO) falls short of his NSF-wide request for a 5.2 percent increase, especially when GEO funding had already been cut in fiscal year 2015. *AGI respectfully asks the subcommittee to provide the Geosciences Directorate with $1,372 million for fiscal year 2016* to keep the Directorate on par with the proposed NSF-wide increase of 5.2 percent.

The Geosciences Directorate (GEO) is the principal source of Federal support for academic Earth scientists and their students who seek to understand the Earth and the processes that sustain and transform life on this planet. The Geosciences Directorate provides about 61 percent of Federal funding for basic geoscience research at academic institutions. According to NSF data, the Directorate distributes about 1,600 new awards annually and expects about 15,900 people to participate in GEO

activities in fiscal year 2016, while also supporting indispensible research infrastructure and instruments.

The GEO Directorate plays a significant role in NSF's cross-foundational initiatives, such as the Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS) and Prediction of and Resilience against Extreme Events (PREEVENTS) activities. These exciting projects integrate information from a range of disciplines to address pressing, socially-relevant issues. The geosciences play a large role in INFEWS, providing raw data and information on fossil, nuclear, and renewable energies; the quantity, quality, and distribution of water supplies; and the characteristics, health, and stability of soils and the critical zone where Earth, biological, and human systems intersect. Additionally, geohazards such as earthquakes and landslides are a significant component of PREEVENTS. This NSF-wide initiative has the potential to improve predictability and risk assessments associated with geohazards, which help build resilience to natural and manmade disasters. These investments in pre-disaster research and mitigation will provide an excellent return on investment, both in monetary and social terms. *AGI supports funding of $14.78 million for INFEWS and $23.50 million for PREEVENTS in the Geoscience Directorate and particularly stress the importance of the Earth Science Division to this work.*

NSF's Division of Polar Programs (PLR) funds basic research in the Arctic and Antarctic and manages all U.S. activities in Antarctica as a single, integrated program. The polar regions are the focus of intense scientific and political interest as new navigation routes are opening access to resources and presenting security challenges. NSF-funded research and infrastructure are helping the United States understand environmental conditions in extreme environments, develop polar technology, and construct data-driven strategic and security policies. AGI suggests a minimum of $450 million for the Division of Polar Programs.

NSF funds facilities that enable researchers to access locations, data, and technologies that serve the overall research community. AGI strongly supports robust and steady funding for infrastructure and the operation and maintenance of major facilities, including the Academic Research Fleet, Geodetic and Seismological Facilities for the Advancement of Geosciences and EarthScope (GAGE and SAGE), Ocean Drilling Activities, the Ocean Observatories Initiative, and the National Center for Atmospheric Research (NCAR).

Directorate for Education and Human Resources.—Support for geoscience education within NSF not only helps us meet the demand for a competitive, skilled workforce, but also supports an informed citizenry prepared to make well-informed decisions about the management of our planet and its resources. Outreach and education are important at all levels from K–12 through graduate and should include formal and informal outlets to facilitate lifelong learning. *AGI strongly supports funding for geoscience education at all levels and particularly supports programs to diversify the geoscience student population and workforce.* The INCLUDES (Inclusion across the Nation of Communities of Learners that have been Underrepresented for Diversity in Engineering and Science) initiative should focus funds and attention on this important workforce issue. AGI urges Congress to fund programs in NSF's Directorate for Education and Human Resources, including NSF Scholarships in STEM, Graduate Research Fellowships, Climate Change Education, Research Experiences for Undergraduates, and Advancing Informal STEM Education.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Geoscientists rely on NOAA for much of the data and long-term monitoring that enable research and rapid response for events such as hurricanes, drought, marine oil spills, and a range of coastal phenomena. The National Weather Service (NWS), Oceanic and Atmospheric Research (OAS), National Ocean Service (NOS), and the National Environment Satellite, Data and Information Service (NESDIS) programs provide the data necessary for understanding and mitigating these events, as well as sustaining our natural resources. *AGI supports the President's request for $5.982 billion for NOAA and hopes that the subcommittee will continue to support these crucial initiatives.*

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

Earth scientists and geotechnical engineers versed in the geosciences conduct basic research at NIST that is used by the public and private sectors to build resilient communities and stimulate economic growth. The research conducted and the information gained is essential for understanding natural hazards, identifying the infrastructure needed to build strong communities, and stimulating economic growth. *AGI strongly supports the President's request for $1.12 billion for NIST.*

NIST is the lead agency for the National Earthquake Hazard Reduction Program (NEHRP), an interagency program responsible for the efficient coordination of research and resources to understand and mitigate earthquakes, but has received only a small portion of authorized and essential funding in the past. *AGI supports the reauthorization and funding of the National Earthquake Hazards Reduction Program (NEHRP) in this Congress.*

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA's current fleet of Earth-observing satellites provides the data necessary to understand our dynamic planet. These satellites such as the Advanced Earth Observing Satellite and the Landsat series provide information critical to research and life-sustaining functions like weather forecasting, emergency service response and planning, and tracking ash plumes or oil spills that disrupt the economy and the environment. Geoscientists use Landsat data to monitor, predict, and help land managers to address drought, wildfires, changes in vegetation, and other changes to the Earth's surface. *We strongly support the President's request for $1.947 billion for NASA Earth Science and the NASA/USGS Sustainability Land Imaging Architecture Study Team, which is examining options for continuing Landsat-compatible observations into the future.*

Thank you for the opportunity to present this testimony to the subcommittee.

PREPARED STATEMENT OF THE ASSOCIATION OF PUBLIC AND LAND-GRANT UNIVERSITIES' BOARD ON OCEANS, ATMOSPHERE, AND CLIMATE

On behalf of the Association of Public and Land-grant Universities' (APLU) Board on Oceans, Atmosphere, and Climate (BOAC), we thank you for the opportunity to provide recommendations for the proposed fiscal year 2016 budgets for the National Oceanic and Atmospheric Administration (NOAA), the National Aeronautic and Space Administration (NASA) and the National Science Foundation (NSF). BOAC represents hundreds of scientists and administrators at APLU's 238 member universities and systems. *We support a budget of $80 million for NOAA's National Sea Grant College Program, $5.49 billion for NASA's Science Directorate and $7.7 billion for NSF. We also support a full restoration of all of NOAA, NASA, and NSF's STEM Programs.*

According to the National Climatic Data Center (NCDC), between 1980 and 2013, there were 178 weather/climate disasters that each exceeded $1 billion in damages. Combined, they exceed $1 trillion in losses. The Federal Government spent nearly $140 billion on disasters in 2012 alone. Further, the U.S. economy often takes a hit from disasters as well. The drought of 2012 likely cost the U.S. economy over $30 billion. Additionally, the role of the Federal Government in covering many of these losses has grown tremendously over the last few decades. Erwann Michel-Kerwann, chairman of the OECD's Board on Financial Management of Catastrophes, noted that in 1989, Federal relief covered only 23 percent of total damage whereas Federal relief covered 69 percent of Hurricane Ike in 2008 and 75 percent of Hurricane Sandy in 2012.

To decrease future Federal expenditures and to make the Nation more prepared for natural disasters, Federal agencies are working with communities across the Nation to enhance their resilience. Community resilience is a measure of the ability of a community to prepare for, respond to, and fully bounce back from a variety of crises. Through research, Federal science agencies can play a valuable role in helping communities strengthen their resilience.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Within the administration's fiscal year 2016 budget proposal, there is a proposal to increase the Regional Coastal Resilience Grants program by $45 million to "(1) increase the resilience of coastal communities and ecosystems by assisting with planning for and addressing extreme weather events, coastal inundation, climate hazards, changing ocean conditions, and competing uses; and (2) to support regional approaches that leverage existing resources and efforts and promote collaboration across jurisdictions and sectors." This proposal nearly mirrors the National Sea Grant College Program's goals to (1) develop vibrant and resilient coastal economies; (2) aid communities in using comprehensive planning to make informed strategic decisions; (3) improve coastal water resources to sustain human health and ecosystem services; and (4) to help resilient coastal communities adapt to the impacts of hazards and coastal changes.

Thus, while we applaud and support the administration's attention to coastal resilience, we suggest that the National Oceanic and Atmospheric Administration (NOAA) capitalize on the capacity that exists in the Sea Grant Program to add value to this initiative. Sea Grant would strengthen the research and education component of this resiliency effort. Furthermore, as required by law, each dollar Sea Grant receives in Federal funding must be matched at the State level. Finally, Sea Grant is local; it provides NOAA with boots on the ground throughout the country's coastal areas. Sea Grant personnel hear directly from community members about their needs and work directly with communities to provide technical assistance. We provide below two examples of the type of work Sea Grant has done related to community resiliency.

Sea Grant has a proven track record with regard to coastal community resilience work. For example, the Mississippi-Alabama Sea Grant Consortium developed the Coastal Community Resilience Index (CCRI), a community self-assessment tool, in response to community requests for baseline data they could use to assess how they are progressing toward their goals to become more resilient. Using this tool, communities can identify vulnerabilities and prepare for future natural disasters. So far, 47 communities across the Gulf of Mexico, working along with 74 facilitators, have utilized the tool to determine their base resilience. A small grants program then provides individual communities financial resources needed to address action items identified by the CCRI.

Sea Grant Programs also target the individual homeowners in coastal communities. For instance, the University of Hawai'i Sea Grant produced a community specific Homeowner's Handbook to Prepare for Natural Hazards. Using non-technical language, the book offers homeowners step-by-step instructions for hazard preparation along with education on the hazard risk in their area. This book has proven so popular it has gone through 8 print runs and has now been adapted to Alabama, Delaware, Florida, Louisiana, Massachusetts, Mississippi, and Texas.

Based on the examples given, we encourage the subcommittee to fund Sea Grant at $80 million, allowing the Program to then be heavily utilized in NOAA's resiliency efforts.

Underlying all of the programs above are the skilled scientists, educators, and community engagement specialists in academia, non-profits, industry and State, local, and Federal Government that actually perform the work. The continuity and durability of that workforce relies on strong educational programs that recruit, mentor, and develop the necessary human capacity. The administration's budget calls for the elimination of several important STEM programs at NOAA that contribute to the development of a workforce with the skills and expertise needed in our 21st century economy.

NOAA's Fisheries Sea Grant Fellowship encourages students to pursue careers in population and ecosystem dynamics or marine resource economics, areas vital to NOAA's management of the Nation's fisheries. The NOAA Teach at Sea Program permits K–12 teachers the opportunity to experience hands-on, real world research on NOAA's fisheries, oceanographic, or hydrographic survey cruises. This allows those teachers to enrich their curricula and enhance their approaches to teaching science. Finally, it is not enough in today's complex world to know only the technical aspects of one's science discipline, but also to hone professional skills needed to become tomorrow's leaders. The John A. Knauss Marine Policy Fellowship provides exactly that type of training.

BOAC strongly encourages the subcommittee to restore funding for all the NOAA STEM programs.

NATIONAL SCIENCE FOUNDATION

BOAC supports the administration's request of $7.7 billion for the National Science Foundation (NSF). NSF provides 61 percent of geoscience basic research funding, including support for critical infrastructure such as the National Center for Atmospheric Research—Wyoming Supercomputing Center, the Academic Research Fleet, and the Ocean Observatories. Additionally, NSF is the home of traditionally strong STEM education programs.

BOAC supports the budget request for NSF's geosciences directorate. NSF's investments in the geosciences address important national challenges, spur new economic sectors, and lead to the development and implementation of advanced technologies that save lives, protect property, and support our economy. BOAC also supports the NSF's creation of the focused research effort called Prevention of and Resilience against Extreme Events (PREEVENTS), the purpose of which is to enhance national resilience to natural hazards. Like the Hazards SEES (Science, Engineering, and Education for Sustainability) before it, PREEVENTS will improve quan-

titative models and qualitative research that should aid societal preparedness and resilience. In particular, PREEVENTS will promote disciplinary and multidisciplinary projects for significant near– or medium-term advances.

BOAC is also pleased to see NSF expand research into Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS). In its "Science Education and Outreach Roadmap for Natural Resources," APLU's BOAC and its Board on Natural Resources identified six major grand challenges facing the Nation's natural resources, three of which are agriculture, energy, and water. There are many examples of where these three come into play with one another. The drought in California affects not only California's enormous agricultural system but also the State's production of hydroelectricity. Many of the Nation's important waterways face problems with eutrophication from nutrient runoff from intensive agricultural production.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Like NOAA & NSF, the National Aeronautics and Space Administration (NASA) is critical to community resilience, both for developing an understanding of the earth and how it functions as well as collection of the data scientists use to help aid decision-makers.

In 2007, the National Academies issued the report, *"Earth and Science Applications from Space: National Imperatives for the Next Decade and Beyond."* The report found that between 2000 and 2009 funding for Earth Sciences (ES) had fallen substantially. Past investments in NASA's science mission have funded university research that has resulted in the development of new instruments and technologies and in valuable advances in weather forecasting, climate projections and understanding of Earth ecosystems.

NASA is instrumental in deploying satellites used by NOAA. Furthermore, without the tools developed at NASA, oceanic, atmospheric, hydrologic and Earth-system scientists and the Nation would have only a fragmentary picture of the interconnected functioning of the planet's oceans, atmosphere and land. NASA plays a role in technology transfer from NOAA by testing new sensors. NASA is currently developing a sensor that will for the first time give scientists and resource planners a global picture of the world's terrestrial water supplies. Currently many lakes and rivers are not monitored and there is no centralized location for water resource information. The NASA data archive is an irreplaceable collection of environmental information that researchers depend upon. NASA also flies the WB–57 high altitude research aircraft, which performs valuable atmospheric research missions including remote sensing for coastal resiliency and the study of hurricane formation and intensity change. Furthermore, through its support for young scientists and graduate students, the NASA science mission supports innovation in the education and future workforce pipeline.

Finally, we support funding NASA to develop and implement a scatterometer mission with fast community access to those data, capability to distinguish between wind and rain and a higher orbit for coverage of Alaskan waters. The scatterometer has been a critical component of hurricane prediction.

BOAC thanks you for the opportunity to provide our views to the subcommittee. We look forward to working with you through the fiscal year 2016 appropriations process.

ABOUT APLU AND THE BOARD ON NATURAL RESOURCES

APLU's membership consists of 238 State universities, land-grant universities, State-university systems and related organizations. APLU institutions enroll more than 4.8 million undergraduate students and 1.3 million graduate students, award 1.2 million degrees, and conduct $41 billion annually in university-based research annually. The Board's mission is to provide Federal relations for issues involving university-based programs in marine, atmospheric, and climatological sciences. BOAC representatives are chosen by their president's office to serve. They include some of the Nation's leading research and educational expertise in atmospheric, marine, and climate disciplines.

PREPARED STATEMENT OF THE ASSOCIATION OF SCIENCE-TECHNOLOGY CENTERS

INTRODUCTION

Chairman Shelby, Ranking Member Mikulski, and members of the subcommittee, thank you for the opportunity to submit written testimony for the record. My name is Anthony (Bud) Rock, and I serve as the President and Chief Executive Officer of the Association of Science-Technology Centers (ASTC). My testimony today ad-

dresses the importance of science, technology, engineering, and mathematics (STEM) education, and will focus specifically on the fiscal year 2016 budgets for four specific programs at three Federal agencies over which your subcommittee has jurisdiction, including: (1) the Competitive Program for Science Museums, Planetariums, and NASA Visitor Centers Plus Other Opportunities (CP4SMP+) at the National Aeronautics and Space Administration (NASA),which would not be funded under the President's fiscal year 2016 request; the Bay-Watershed Education and Training (B–WET) Regional Programs and Competitive Education Grants (CEG)/Environmental Literacy Grants (ELG) programs at the National Oceanic and Atmospheric Administration (NOAA), which would not be funded under the President's fiscal year 2016 request; and the Advancing Informal STEM Learning (AISL) program at the National Science Foundation (NSF), which would receive $60 million under the President's fiscal year 2016 request.

OUR REQUEST

On behalf of ASTC and the nearly 400 science centers and museums we represent here in the United States, I urge the subcommittee to continue its strong support for critical STEM education programs within NASA, NOAA, and NSF as the Commerce, Justice, Science, and Related Agencies appropriations bill for fiscal year 2016 moves forward. Specifically, I urge you to:

—Provide $10 million for the Competitive Program for Science Museums, Planetariums, and NASA Visitor Centers Plus Other Opportunities at the National Aeronautics and Space Administration.

—Provide $12 million for the Bay-Watershed Education and Training Regional Programs and $8 million for the Competitive Education Grants/Environmental Literacy Grants programs at the National Oceanic and Atmospheric Administration.

—Provide $60 million for the Advancing Informal STEM Learning program at the National Science Foundation.

—Continue to thoroughly examine any proposals that would seek to consolidate and/or reorganize Federal STEM education programs in an effort to ensure that stakeholder input has been sought and that proven, successful programs are maintained.

Before providing more detail about ASTC and the science center and museum field, I want to first offer a brief snapshot of these Federal programs and why they are so vital to communities across the country.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA's *Competitive Program for Science Museums, Planetariums, and NASA Visitor Centers Plus Other Opportunities* provides support for education or research engagement projects, exhibits, and/or partnerships with K–12 schools to support inquiry- or experiential-based activities led by informal education institutions—like science centers and museums—that feature NASA missions, science, engineering, explorations, or technologies.

With fiscal year 2014 funding, NASA awarded funding to 12 projects, including three NASA Visitor Centers. Three Maryland-based institutions—the Maryland Science Center, the Prince George's County Public Schools' Howard B. Owens Science Center, and the Goddard Space Flight Center—collaborated on a proposal and are receiving support to make educators, students, families, and the public more aware and better informed of NASA heliophysics science and NASA missions studying the Sun. Program participants will come to a better understanding of the Sun, space weather, and the Sun's far-reaching influence on our planet and the rest of the solar system.

Though Congress—and this subcommittee—have been very supportive of this program since its inception in fiscal year 2008, the agency has not indicated if any fiscal year 2015 funds will be available for new grants. Furthermore, the President did not include funding for the program in his fiscal year 2016 budget request. *I encourage the subcommittee to continue its strong support for the CP4SMP+ by providing $10 million for fiscal year 2016.*

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NOAA's *Bay-Watershed Education and Training Regional Programs* are environmental education offerings that promote locally relevant, experiential learning in the K–12 environment. The program, which currently serves seven areas of the country (California, the Chesapeake Bay, the Great Lakes, the Gulf of Mexico, Hawai'i, New England, and the Pacific Northwest), promotes environmental literacy in society by supporting individuals to understand, protect, and restore watersheds

and related ecosystems. With fiscal year 2015 funding for 86 new and continuing awards, B–WET grants will reach an estimated 69,000 students and 2,600 teachers.

NOAA's *Competitive Education Grants/Environmental Literacy Grants program,* which the agency touts as "the longest-standing and most comprehensive national grants program focused on environmental literacy," helps improve and increase the understanding and use of earth systems science while advancing STEM education. Since its beginnings in 2005, NOAA has made 111 awards to over 150 institutions across the country—all of which help advance its mission. The agency estimates that each year, an average of 60 million people visit an institution—like a science center or museum—that has a NOAA-funded exhibit or program.

Despite this measurable impact, the President's fiscal year 2016 budget request once again proposes the termination of both the B–WET and the CEG/ELG programs, which received $7.2 million and $4 million, respectively, for fiscal year 2015. For fiscal year 2016, *I urge the subcommittee to remain supportive of the programs by providing $12 million in funding for B–WET and $8 million in funding for CEG/ELG.*

NATIONAL SCIENCE FOUNDATION

Fiscal year 2016 funding for the *Advancing Informal STEM Learning* program, offered by the Directorate for Education and Human Resources and the Division of Research on Learning in Formal and Informal Settings, will provide resources to support design, adaptation, implementation, and research on innovative modes of learning in the informal environment, with important emphases on citizen science, making, and cyberlearning. Just last year, new awards were made to the University of Alaska-Fairbanks (in partnership with the Oregon Museum of Science and Industry), the University of Maryland Center for Environmental Sciences, the University of Wisconsin-Madison, and the University of New Hampshire, to name just a few.

The President's fiscal year 2016 budget request includes $60 million—$5 million more than the fiscal year 2015 appropriated level—for AISL. *I encourage the subcommittee to support the President's request.*

STEM EDUCATION CONSOLIDATION AND REORGANIZATION

With regard to the Federal STEM education consolidation plan first released by the administration for fiscal year 2014 and amended in each of the last two budget requests, I recognize the importance of creating efficiencies within the Federal Government whenever possible. Nevertheless, I continue to have serious concerns about a proposal that would eliminate effective programs that support informal STEM learning. Integral Federal investments, including the aforementioned NASA and NOAA offerings, are once again slated for elimination in fiscal year 2016. I sincerely appreciate the subcommittee's thoughtful consideration of the harmful effect of the proposed terminations, and ask you to remain steadfast in your support of these programs.

ABOUT ASTC AND SCIENCE CENTERS

The Association of Science-Technology Centers is a global organization providing collective voice, professional support, and programming opportunities for science centers, museums, and related institutions, whose innovative approaches to science learning inspire people of all ages about the wonders and the meaning of science in their lives. Science centers are sites for informal learning, and are places to discover, explore, and test ideas about science, technology, engineering, mathematics, health, and the environment. They feature interactive exhibits, hands-on science experiences for children, professional development opportunities for teachers, and educational programs for adults. In science centers, visitors become adventurous explorers who together discover answers to the myriad questions of how the world works—and why. As members of this subcommittee know, it is imperative that we spark an interest in STEM fields at an early age—a key role for community-based science centers and museums, who often undertake this effort with the aforementioned modest—but important—support from NASA, NOAA, and NSF, in addition to other Federal agencies.

ASTC works with science centers and museums to address critical societal issues, locally and globally, where understanding of and engagement with science are essential. As liaisons between the science community and the public, science centers are ideally positioned to heighten awareness of critical issues like agriculture, energy, the environment, infectious diseases, and space; increase understanding of—and exposure to—important and exciting new technologies; and promote meaningful exchange and debate between scientists and local communities.

ASTC now counts 636 members, including 489 operating or developing science centers and museums in 45 countries. Collectively, our institutions garner 95 million visits worldwide each year. Here in the United States alone, our guests—and your constituents—pass through science center doors more than 73 million times to participate in intriguing educational science activities and explorations of scientific phenomena.

Science centers come in all shapes and sizes, from larger institutions in big metropolitan areas to smaller centers in somewhat less populated ones. ASTC represents institutions as diverse as the Adventure Science Center in Nashville; the Anchorage Museum at Rasmuson Center; the Connecticut Science Center; the Echo Lake Aquarium and Science Center in Burlington, Vermont; the Maine Discovery Museum in Bangor; the McWane Science Center in Birmingham; the Museum of Discovery in Little Rock; and the Providence Children's Museum.

Our centers reach a wide audience, a significant portion of which are school groups. Here in the United States, 94 percent of our members offer school field trips, and we estimate that more than 13 million children attend science centers and museums as part of those groups each year. Field trips, however, are truly just the beginning of what science centers and museums contribute to our country's educational infrastructure, as: 92 percent offer classes and demonstrations; 90 percent offer school outreach programs; 76 percent offer workshops or institutes for teachers; 74 percent offer programs for home-schoolers; 67 percent offer programs that target adult audiences; 65 percent offer curriculum materials; 50 percent offer afterschool programs; 34 percent offer youth employment programs; and 22 percent offer citizen science projects.

CONCLUSION

With this in mind, and while I am fully aware of the significant budget challenges that face this subcommittee, Congress, and the Nation, I hope you will continue to recognize the important educational offerings science centers and museums make available to students, families, and teachers, along with the essential Federal support they receive from NASA, NOAA, and NSF.

Again, I respectfully request and urge you to:

—Provide $10 million for the Competitive Program for Science Museums, Planetariums, and NASA Visitor Centers Plus Other Opportunities at the National Aeronautics and Space Administration.

—Provide $12 million for the Bay-Watershed Education and Training Regional Programs and $8 million for the Competitive Education Grants/Environmental Literacy Grants program at the National Oceanic and Atmospheric Administration.

—Provide $60 million for the Advancing Informal STEM Learning program at the National Science Foundation.

—Continue to closely examine any proposals that would seek to consolidate and/or reorganize Federal STEM education programs in an effort to ensure that stakeholder input has been sought and that proven, successful programs are maintained.

Thank you once again for your strong support for America's science centers and museums—and for the opportunity to present these views. My staff and I would be happy to respond to any questions or provide additional information as needed by the subcommittee.

PREPARED STATEMENT OF THE ASSOCIATION OF ZOOS AND AQUARIUMS

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Thank you Chairman Shelby and Ranking Member Mikulski for allowing me to submit testimony on behalf of the Nation's 214 AZA-accredited zoos and aquariums. Specifically, I want to express my support for the inclusion of $4 million for the John H. Prescott Marine Mammal Rescue Assistance Grant Program, $8,000,000 for the National Oceanic and Atmospheric Administration (NOAA) Environmental Literacy Grants Program (including $2,500,000 for the NOAA Ocean Education Grants Program), and $12,000,000 for the Bay, Watershed, Education and Training Program in the fiscal year 2016 Commerce, Justice, Science, and Related Agencies appropriations bill. Additionally, I urge you to reject any proposal that eliminate valuable ocean education programs as part of a plan to restructure Federal Science, Technology, Engineering, and Math (STEM) programs.

Founded in 1924, the Association of Zoos and Aquariums (AZA) is a nonprofit 501c(3) organization dedicated to the advancement of zoos and aquariums in the

areas of conservation, education, science, and recreation. AZA-accredited zoos and aquariums annually see more than 180 million visitors, collectively generate more than $17 billion in annual economic activity, and support more than 165,000 jobs across the country. Over the last 5 years, AZA-accredited institutions supported more than 4,000 field conservation and research projects with $160,000,000 annually in more than 100 countries. In the last 10 years, accredited zoos and aquariums formally trained more than 400,000 teachers, supporting science curricula with effective teaching materials and hands-on opportunities. School field trips annually connect more than 12,000,000 students with the natural world.

During the past 20 years AZA-accredited zoos and aquariums have rescued and rehabilitated more than 1,800 marine animals including stranded dolphins, whales, sea lions, seals, sea otters, sea turtles, and manatees. More than 1,750 (97 percent) of these animals have been successfully released back into their natural habitat. While the Nations' accredited zoos and aquariums support wildlife rehabilitation through their ongoing animal rescue programs, these institutions are sometimes involved in addressing natural and manmade disasters such as the 2010 *Deepwater Horizon* Gulf oil spill. For example, following the oil spill, accredited zoos and aquariums around the country offered assistance by pledging the services of 200 animal care professionals and donating supplies, vehicles, and other resources to assist in the wildlife rescue efforts.

The John H. Prescott Marine Mammal Rescue Assistance Grant Program provides grants or cooperative agreements to eligible stranding network participants for the recovery and treatment (i.e., rehabilitation) of stranded marine mammals; data collection from living or dead stranded marine mammals; and, facility upgrades, operation costs, and staffing needs directly related to the recovery and treatment of stranded marine mammals and collection of data from living or dead stranded marine mammals. Eligible applicants are currently active, authorized participants, including AZA-accredited zoos and aquariums, or researchers in the National Marine Mammal Stranding Network.

Without the Prescott grant program, NOAA would have to rely on private organizations as it coordinates the response to marine mammals in distress; determines disease, injury and potential cause(s) of death; and supports emergency response for marine mammals during oil spills, outbreaks of diseases, and unusual mortality events. Network partners may not have the funds or the ability to respond to some stranding events, leaving animals at risk for prolonged exposure and likely death. Without funding for this program the critical ability to monitor marine mammal health trends, collect scientific data, and perform analysis would also be diminished. Information about the causes of marine mammal strandings is useful to the public because marine mammals can serve as an indicator of ocean health, giving insight into larger environmental issues that also have implications for human health and welfare.

At the same time that AZA-accredited zoos and aquariums are working with Federal partners to conserve ocean wildlife, they also are providing essential learning opportunities, particularly about science, for schoolchildren in formal and informal settings. Increasing access to formal and informal science education opportunities has never been more important. Studies have shown that American schoolchildren are lagging behind their international peers in certain subjects including science and math.

The NOAA Ocean Education Grants Program and Bay, Watershed, Education and Training Program bring students closer to science by providing them with the opportunity to learn firsthand about our world's marine resources. Through these grant programs, aquariums work closely with Federal, State, and local partners on projects with long-lasting benefits not only for the students but their communities as well. For example, previous projects funded by NOAA Ocean Education Grants at AZA aquariums have focused on establishing a regional network of summer camp programs grounded in ocean science, enhancing teen conservation leadership programs, and conserving and managing coastal and marine resources to meet our Nation's economic, social and environmental needs. As schools face increased budgetary pressures, these types of education programs at aquariums will become even more important in ensuring that American schoolchildren receive the necessary foundation in science education that they will need to be competitive in the 21st century global economy.

AZA-accredited zoos and aquariums are essential partners at the Federal, State, and local levels to improve education for schoolchildren and ensure that current and future generations will be good stewards of the world's oceans. Therefore, I urge you to include $4 million for the John H. Prescott Marine Mammal Rescue Assistance Grant Program, $8,000,000 for the NOAA Environmental Literacy Grants Program (including $2,500,000 for the NOAA Ocean Education Grants Program), and

$12,000,000 for the Bay, Watershed, Education and Training Program in the fiscal year 2016 Commerce, Justice, Science, and Related Agencies appropriations bill.

Thank you.

PREPARED STATEMENT OF THE CONSORTIUM FOR OCEAN LEADERSHIP

On behalf of the Consortium for Ocean Leadership, I appreciate the opportunity to discuss the fiscal year 2016 Federal science budget for the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). Ocean Leadership represents 89 of the Nation's leading oceanographic research and education institutions with the mission to shape the future of ocean sciences. We respectfully request the subcommittee provide no less than $7.72 billion for the NSF; $1.95 billion for Earth Sciences at NASA; and $6 billion for NOAA. These funds will help maintain U.S. global leadership in ocean science and technology, which is critical to American agriculture, energy development, a changing Arctic, ocean exploration and a healthy U.S. scientific workforce.

OCEAN FORECASTS ARE CRITICAL TO AMERICAN AGRICULTURE

The ocean drives global water and weather systems through the absorption, retention and transportation of vast amounts of the Earth's heat, water and carbon dioxide. Thanks to the longstanding bipartisan support of this subcommittee, our Nation has been well positioned to lead the world in innovation while also effectively and efficiently incorporating environmental data into marketplace. For example, the support of this committee enabled NOAA to better service the buoys comprising the TAO Array (Tropical Atmosphere Ocean project in the equatorial Pacific), which had degraded significantly and is critical for seasonal weather predictions.

One of the most important influences on weather variation is derived from El Niño Southern Oscillation, or ENSO, which is a coupled atmosphere-ocean oscillation that impacts atmosphere and ocean circulation patterns across the equatorial Pacific. A rise in sea surface temperatures in the eastern tropical Pacific and an eastward shift in the convection in the western Pacific typically characterizes an El Niño event, which causes major seasonal temperature and precipitation changes around the world, including changes in rainfall over much of America's most productive croplands. Consequently, commodity strategists incorporate predictions of El Niño events into commodity prices months and in some cases up to a year in advance. Last year, experts predicted that there would up to an 80 percent chance of an El Niño occurring, which led to increased prices for commodities such as coffee and cocoa. Yet, while sea surface waters rose in the equatorial Pacific, the trade winds never materialized and El Niño didn't arrive as predicted. Consequently, the drought-stricken west didn't experience the higher rainfalls expected during El Niño events. Such information is vital not only for the agriculture industry but also the insurance industry, the energy sector, and national security as civil unrest can occur overseas when crops fail, fresh water is in short supply, or floods displace populations.

ENSO isn't the only ocean-atmosphere factor in predicting weather. There are other natural variations, including the North Atlantic/Arctic Oscillation, which is related to the Polar Vortex and mainly influences the temperature and precipitation in the eastern half of the United States. The Pacific Decadal Oscillation interacts with ENSO to influence weather in the western United States. However, today's predictive models have not matured enough to forecast these oscillations nearly as well as we have been predicting ENSO. With the unrealized El Niño prediction of 2014, clearly we still have a ways to go in improving models on seasonal timescales, which is essential for agriculture and energy preparation as well as preparing for drought and flooding. While the TAO array has been very helpful for ENSO predictions, so much of the global ocean is not yet measured, especially the surface meteorology and air-sea fluxes. Satellite observations are essential as they give us a global view and are advancing with new salinity sensors and improved altimetry. Yet, we are faced with potential data gaps in our polar orbiting satellites that provide critical data for weather forecasts. To truly become a weather ready nation, we need sustained ocean observations, both from space as well as in situ, particularly at depth.

MARINE ROBOTICS AND OCEAN VEHICLES ESSENTIAL TO U.S. TECHNOLOGY LEADERSHIP

Investment in basic technology research for the geosciences has spurred the growth of marine robotics, which like the transition from sail to steam power, is

ushering in a new chapter in ocean observation and monitoring. Autonomous underwater robotic systems open the door for routine and persistent access to the deep ocean, allowing the expansion of commercial activities that include offshore oil and gas exploration, undersea mining, aquaculture, and installation of marine wind and wave energy facilities and submarine communication cables. Thus far marine robotic systems have been tied to ships, but newer systems are able to operate independently, providing broader and more long-term access for baseline environmental assessments and observing and for equipment monitoring and maintenance, reducing shipping and permitting costs and greatly improving hazards response management. At one time, U.S. oceanographic institutions were among the few organizations in the world that could build and operate deep ROVs. Now these vehicles are used by the entire oceanographic community for a variety of uses including offshore energy production. Hydroid Inc., Teledyne Webb Research, and Bluefin Robotics are three highly successful job-creating companies that spun off from academic research laboratories (Woods Hole Oceanographic Institution and MIT). Together, these three companies dominate worldwide production of autonomous underwater vehicles, with deployed systems projected to grow by 42 percent over the next 4 years (Douglas-Westwood study).

Researchers at Oregon State University are outfitting undersea gliders with acoustic sensors to identify biological "hot spots" in the coastal ocean. These new smart gliders will be able to identify different kinds of marine animals using their unique acoustical signatures, which will ultimately benefit the fishing industry and resource managers. The geosciences directorate at NSF needs to be a priority if it is going to continue to support the basic research required to develop the next generation vehicles and sensors in what is becoming a globally competitive marketplace.

MAINTAINING U.S. GLOBAL POSTURE IN THE ARCTIC

The United States is an Arctic nation, where significant economic, social and national security interests intersect. The Arctic harbors tremendous natural resources, thriving and productive ecosystems, and is increasingly becoming an international focus for expanded navigation and commerce. Yet, in many places, the seafloor is virtually uncharted and the water column is essentially unknown. We are already observing a rise in commercial activity in the Arctic in terms of shipping, fishing and oil and gas exploration, which could eventually lead to boundary disputes among nations or accidents that require search and rescue or oil spill response. Put simply, the United States is not yet prepared to respond to an accident or serious incident in the Arctic. And it's not just the cargo ships that are traversing the Arctic, as there are also marine species that are making their way between the Pacific and Atlantic for the first time in millennia, which may have negative ecological implications as invasive species. Because of its high latitude, effects of a rapidly changing climate are amplified. Climate projections for the Arctic region depend on knowing the state and circulation of the Arctic Ocean, yet ocean-ice interactions are poorly understood. Furthermore, the Arctic basin is insufficiently mapped and instrumented for real-time observations, and there is a need for improved integration of observations into models to produce reliable projections.

As ice cover decreases in this part of the world, ocean warming will accelerate because ice reflects 90 percent of solar radiation and the oceans absorb 90 percent. The result will be an increase in sea level, release of methane gasses that could further contribute to climate change, and an increase in extreme weather events in lower latitudes. But with great change comes great opportunity. As the United States assumes chairmanship of the Arctic Council, our Nation stands at a pivotal moment with the opportunity to proactively manage, protect and use this unique ecosystem proactively. Consequently, Ocean Leadership recently convened a forum to discuss the state of current knowledge, and how we can achieve the capacity to more accurately predict these changes. It is critical for operators in the Arctic and for U.S. diplomatic leadership that our science agencies, including NSF, NOAA and NASA, have the resources to develop and deploy the technologies we need to observe, monitor and understand this pivotal region.

OCEAN EXPLORATION IS AMERICA'S NEXT FRONTIER

The ocean is the predominant physical feature on our planet, covering 71 percent of the Earth's surface, containing 97 percent of the planet's water and 99 percent of the Earth's habitat. Despite the fact that most life on Earth lives in the ocean, 95 percent of the ocean remains unexplored. The estimated 91 percent of the sea-life that remains undiscovered may prove vital to human health and well-being through the development of pharmaceuticals and medicinals. For instance, biologist

Stanley Watson from Woods Hole Oceanographic Institution conducted fundamental research on bacteria's role in the marine food web in the 1970's. This work resulted in a patent for the detection of bacteria in seawater, using an extract from the blood of horseshoe crabs, which spun off into a company that was the first licensed by the FDA to detect the presence of different kinds of human disease causing bacteria. Today, more than a half a million crabs are captured each year to "donate" about 30 percent of their blood (valued at $60,000 per gallon) for a global industry valued at $50 million a year that ensures the sterility of vaccines, IV fluids, surgical instruments, artificial implants, and countless other drugs and medical devices. It is important for NOAA to have a robust ocean exploration endeavor and for NSF and NASA to continue funding basic research in this area that may form the building block for the next generation of cures for human ailments.

EDUCATING THE NEXT GENERATION OF GEOSCIENTISTS

The geosciences support from NSF, in addition to the STEM education programs at the mission agencies, is essential for training the next generation of geoscientists. The Workforce Research team at the American Geosciences Institute calculated that there will be a shortage of 135,000 geoscientists in the U.S. workforce over the next decade. We can ill afford to have a shortage of these workers that are vital for the energy and weather forecasting industries as well as natural resource managers, land use planners and first responders. Diversity continues to be a challenge for the scientific community as we need to develop a workforce whose composition better resembles the broader population. We greatly appreciate the support this subcommittee has given to STEM education programs at NSF, NOAA and NASA, and encourage this support to extend into the geoscience directorate at NSF, which aids the development of thousands of early career geoscientists.

As you draft your spending bill, I hope that you will note that the bulk of the intellectual capacity regarding the ocean environment resides within the academic research community. Peer-reviewed extramural research is the most efficient and effective vehicle for providing our policy makers and our commercial partners with the expertise, information and data necessary to address the emerging challenges facing our Nation. We also hope that you will continue to permit science priorities and decisions to be made by the scientific community, which has enabled America's innovation economy to thrive for decades. Given the austere fiscal environment, we are prepared to work with the Foundation to help ensure that there is robust core research at a time when new facilities are coming online.

In summary, the funding we have recommended is essential for American agriculture and energy security, U.S. technology leadership, our global posture in the Arctic, ocean observing and exploration, and the next generation of American scientific talent.

Mr. Chairman and members of the subcommittee, I greatly appreciate the opportunity to share our recommendations, and I encourage you to continue your longstanding bipartisan support for science funding in the fiscal year 2016 budget and into the future.

Below is a list of the institutions that are represented by the Consortium for Ocean Leadership.

Alabama

Dauphin Island Sea Lab

Alaska

University of Alaska Fairbanks
Alaska Ocean Observing System
North Pacific Research Board

California

Bodega Marine Lab
Monterey Bay Aquarium Research Institute
Moss Landing Marine Laboratory
Naval Postgraduate School
Stanford University
University of California, Santa Barbara
University of California, Santa Cruz
University of California, San Diego (Scripps)
University of Southern California
Aquarium of the Pacific
Hubbs-SeaWorld Research Institute
Romberg Tiburon Center for Environmental Studies
Esri
L–3 MariPro, Inc.
Liquid Robotics, Inc.
Teledyne RD Instruments

Colorado

Cooperative Institute for Research in Environmental Sciences (CIRES)

Connecticut

University of Connecticut

Delaware

University of Delaware
Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS)

Florida

Florida State University
Harbor Branch Oceanographic Institute at FAU
Mote Marine Laboratory
University of Florida
University of Miami
University of South Florida
Earth2Ocean, Inc.
Florida Institute of Oceanography
Nova Southeastern University

Georgia

Skidaway Institute of Oceanography of the University of Georgia
Savannah State University

Hawaii

University of Hawaii

Illinois

John G. Shedd Aquarium

Louisiana

Louisiana Universities Marine Consortium (LUMCON)
Louisiana State University

Maine

Bigelow Laboratory for Ocean Sciences
University of Maine
The IOOS Association (formerly NFRA)

Maryland

University of Maryland Center for Environmental Science
Johns Hopkins University
Marine Technology Society
National Aquarium

Massachusetts

Massachusetts Institute of Technology
University of Massachusetts
Woods Hole Oceanographic Institution

Michigan

University of Michigan

Mississippi

University of Mississippi
University of Southern Mississippi

Nebraska

University of Nebraska, Lincoln

New Hampshire

University of New Hampshire

New Jersey

Rutgers University

New York

Columbia University (LDEO)
Stony Brook University

North Carolina

Duke University Marine Laboratory
University of North Carolina, Chapel Hill
University of North Carolina, Wilmington
East Carolina University
North Carolina State University

Oregon

Oregon State University

Pennsylvania

Pennsylvania State University

Rhode Island

University of Rhode Island

South Carolina

Belle W. Baruch Institute for Marine and Coastal Sciences
South Carolina Sea Grant Consortium

Texas

Harte Research Institute
Texas A&M University
University of Texas, Austin
Fugro
Sonardyne, Inc.

Virginia

College of William and Mary (VIMS)
Old Dominion University
CNA
Institute for Global Environmental Strategies (IGES)
U.S. Arctic Research Commission
CARIS, USA
SAIC

Washington

University of Washington
Sea-Bird Scientific

Washington, DC

National Ocean Industries Association (NOIA)
Southeastern Universities Research Association (SURA)

Wisconsin

University of Wisconsin-Milwaukee, School of Freshwater Sciences

Australia

Institute for Marine and Antarctic Studies (IMAS) at the University of Tasmania

Bermuda

Bermuda Institute of Ocean Sciences (BIOS)

Canada

Dalhousie University
University of Victoria

PREPARED STATEMENT OF THE FISH LOCALLY COLLABORATIVE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

Members and supporters of the Fish Locally Collaborative appreciate the opportunity to submit comments on the proposed fiscal year 2016 budget for the National Marine Fisheries Service. The Fish Locally Collaborative (FLC) is a network of fishing communities, including fishers, processors, marketers, families, scientists, and seafood consumers, with over 400 individuals representing 60 organizations and networks, and over 400,000 fishing families spanning the globe. The FLC does not speak as a unified voice on all matters, but rather seeks to collaborate, research, and learn from each other in developing new solutions and policy directives in sustainable fisheries.

FLC VALUES AND PERSPECTIVES

The FLC is committed to restoration of marine ecosystems, fishing communities, and a fair seafood value chain. The network values a genuine democratic and bottom-up approach to fisheries management, which is needed to achieve healthier ecosystems and ensure a diverse fleet that maximizes value to fishing communities, local economies, and the food system. Success will be achieved when appropriate management tools are made available, fishermen's local knowledge is accounted for in the decision-making process, and the scale of fishing matches the scales of the ecosystems.

The fishing industry includes ports, fleets, processors, fish workers, and people who eat seafood. Our Nation benefits from strong coastal communities (both rural and urban) and measuring a fisherman's impact needs to include the triple bottom line with an increased focus on community (social) values and benefits. Large-scale corporate interest and control over access to fisheries hurts marine ecosystems, hurts local economies, hurts the seafood value chain, and divides fishing communities.

The Magnuson Stevens Fisheries Conservation and Management Act establishes goals and describes national benefits in terms of fish stocks, habitat protection, port economies, and seafood, but current management has focused primarily on fishing and its impact on habitat, to the relative exclusion of community benefits and healthy seafood.

While cutbacks in allowable catch driven by 10-year rebuilding plans have received the greatest attention as the cause of economic distress in the fishing fleets and ports, the current management system has exacerbated these difficulties greatly, particularly for community-based and family-owned boat fishermen, through such mechanisms as: stock assessments unable to deliver reliable predictions and management alternatives; failure to assess non-fishing impacts, such as climate change, pollution, and ecosystem dynamics; collapsing prices due to cheap foreign imports, high-volume extractive fisheries, and weak domestic markets for local seafood; inflexibility in shifting effort of the fleet to other species; regulations that fail to protect the discrete, local fish populations that are so important to community-based and family-owned boats; pressure from real estate development in working waterfronts; and high fuel and other costs of fishing.

WORK OF THE FLC

FLC members are active in researching and creating new models and practices to address a range of needs and opportunities, including: protection of fleet diversity, multi-species harvesting and community-based management approaches; local food system development, such as expanding markets for hospitals, schools, colleges; creating the Community Supported Fishery (CSF) model and replicating it widely; working waterfront protection; value-added product development and waste recovery; ocean planning and decisionmaking. We also reach out to and are informed by experts and practitioners in the farming sector and other related fields of institutional, market, financial, and technology innovation and reform.

COMMENTS ON THE PROPOSED FISCAL YEAR 2016 NMFS BUDGET

It is from this foundation of values, perspectives, and capacity that FLC members and supporters offer specific comments on the proposed fiscal year 2016 NMFS budget.

I. Habitat and Ecosystem-Based Management

A. The FLC offers support for the proposed $5.0 million increase in funding for Ecosystem-based Solutions for Fisheries Management, in particular the language in the Blue Book suggesting that "this integrated, cross-disciplinary, and cross-line office scientific initiative will promote understanding of the importance of inshore and offshore habitat to the productivity and recovery of fisheries and protected species."

The FLC supports this initiative because it can begin to address non-fishing impacts more adequately, in particular the relationship of healthy ocean habitat to healthy fish stocks. Current fisheries management is obligated to manage healthy fish stocks and yet they are not required to address non-fishing impacts such as climate change, pollution, deforestation, mining, and oil and gas exploration, which all have enormous effects on fish population. The narrow approach and micro-focus on controlling fishing pressure in order to maintain healthier fish populations places a disproportionate level of blame and responsibility on fishing businesses and deflects responsibility from large-scale polluters, in particular.

B. The FLC opposes $5.7 million in increased funding for Consultation and Essential Fish Habitat Implementation Capacity, that is intended "to reduce delays and streamline permitting and review timeframes". FLC members are well aware that proposals are fast-emerging for sand mining, oil and gas drilling, offshore aquaculture, and other extractive industries, all of which would threaten to damage fish stocks, marine mammals, habitat, and ocean health more generally. Ocean planning efforts have only just begun in the regions, and it is already clear that the research and knowledge base for properly assessing permit applications is not available. "Zoning" and privatized, long-term leasing of the ocean are also not yet justified as consistent with adaptive, ecosystem-based management principles that NOAA itself espouses.

The ocean is a dynamic and integrated ecosystem, just beginning to experience the impacts of climate change and acidification. The precautionary principle—that when there is scientific uncertainty, a heavy burden of proof rests on the industry—should be the guiding framework at this time. Consultation on permitting should be delayed until a significantly stronger framework for adaptive, ecosystem and community-based management is developed that protects and enhances the public trust in the ocean is developed. We therefore recommend that permitting activities be undertaken cautiously until additional studies are completed and more stringent standards, including for habitat protection, are formulated.

C. NMFS has also requested $2.0 million in additional funds to support Domestic Seafood Production and Jobs through Aquaculture. FLC members generally support expanded shellfish aquaculture, in particular oyster reef restoration that provides multiple benefits in restoring ocean health and providing jobs and food, but would oppose an accelerated permitting of offshore finfish aquaculture, with its history of pollution and relatively unsafe product. FLC members oppose long-term leases that would be tantamount to privatization of the ocean. Any funding made available to the Agency should be directed to further research and pilot projects, including for the potential for polytrophic, multi-species and clean initiatives that both supply healthy seafood and restore habitat.

II. Catch Share Programs and Community Resilience

The NMFS budget proposal includes a $2.2 million increase in funding for the National Catch Share Program, with a justification that "the implementation of catch share programs can yield efficiencies that lower fisheries management costs and increase the profitability of fisheries over time." The NOAA budget also includes funding for a $50 million Regional Coastal Resilience grants program, to develop community, ecosystem, and economic resilience.

FLC members and supporters strenuously object to these goals for Catch Share management, in particular profit maximization, and respectfully suggest that they are in direct conflict and contradiction with NOAA's overarching mission to support and develop community resilience.

On-the-ground experience and recent academic literature both demonstrate that Catch Share programs are consolidating fisheries access into fewer and larger-scale businesses to the exclusion of owner-operator, younger generation, and independent fishermen and to the detriment of crew. This consolidation creates a disproportionate loss of fisheries access to rural communities, loss of capacity and infrastructure in fishing ports, negative ecological impacts, and loss of food access.

We therefore suggest that funding under the Catch Share program be utilized, in partnership with fishing communities and stakeholders, to research the full suite of economic, environmental and social costs imposed on communities and consumers of seafood by the single-minded focus on profit maximization and to explore and de-

velop mechanisms for modifying or ending Catch Shares where they have not worked as predicted, and to develop criteria and standards for "Fishing Community" and "Regional Fishery Associations", fishing community sustainability plans, and fleet diversity protections.

III. Collaborative Research

For 2 years, the Senate Appropriations Report has encouraged NMFS to "expand the Agency's activities in chartering commercial fishing vessels to serve as research and fishery survey vessels." While NMFS and NOAA leadership have indicated their support for collaborative research, little has been done to expand partnerships to date.

It has come to our attention that there are several impediments to collaborative research that the subcommittee could address. NOAA has directed in recent years that all collaborative research projects involving the fishing industry and academic institutions be managed through a competitive grants program and short-term awards. The FLC recommends, based on conversations with both current and former NMFS Science staff and outside researchers, that the subcommittee encourage the development of cooperative agreements on a multi-year basis, as other Federal agencies do. Only cooperative agreements will allow for a genuine partnership to emerge and for all parties to co-draft research plans that incorporate requirements and insights from all parties, including NMFS.

FLC members strongly recommend that an emergency action be take to coordinate a fisheries dependent and independent data collection effort as input to more reliable stock assessments, in cases, such as cod in the Northwest Atlantic, where data is sparse and current management cutbacks on allowable quota are causing severe economic and social distress in the fishing industry and port communities.

IV. Saltonstall-Kennedy Funding

FLC members support continued increases in funding for the Saltonstall-Kennedy grants program for research and development in harvesting, processing, and marketing. In particular, we encourage projects to develop a strong local seafood system, community-based and multi-species fisheries management innovations that diversify catch and develop markets for under-utilized species, value-added and waste recovery product development, shellfish and polytrophic aquaculture pilot projects, boat designs that increase fuel-efficiency and promote safety and use of sustainable technology, and programs to increase access of independent-operator and young entrants.

These comments were based on two prior policy-related letters signed by numerous Fish Locally Collaborative members and supporters throughout the country. The first was a letter on Magnuson-Stevens reauthorization submitted to Congressmen John Tierney and Peter DeFazio on August 13, 2014; the second a public comment letter submitted to the Greater Atlantic Regional Fisheries Office re the GARFO Draft Strategic Plan.

Links to these letters and signatories can be found at:

Congressmen Tierney and DeFazio:
https://drive.google.com/file/d/0BwT-fcX3Ff5VTVVlTDBQYW1ZWE0/view?usp=sharing.

GARFO letter:
https://drive.google.com/file/d/0BwT-fcX3Ff5VYjBnN2laUXd5ZTA/view?usp=sharing.

Signatories include fishermen, academics, seafood business owners, seafood consumers, and advocates from both East and West Coast States and organizational supporters include the American Sustainable Business Council, Slow Food USA, Health Care Without Harm, and others.

[This statement was submitted by Valerie I. Nelson, Ph.D., Policy Transformation Working Group Organizer-FLC.]

PREPARED STATEMENT OF THE JOINT OCEAN COMMISSION INITIATIVE

Chairman Shelby, Ranking Member Mikulski, and other distinguished Members of the Subcommittee on Commerce, Justice, Science, and Related Agencies, we thank you for the opportunity to submit written testimony regarding the fiscal year 2016 Commerce, Justice, Science, and Related Agencies appropriations bill. The Joint Ocean Commission Initiative is a collaborative, bipartisan effort to catalyze meaningful ocean policy reform and action at the national, regional, and State levels. Established in 2005, the Joint Initiative promotes, maintains, and updates the

important work of the U.S. Commission on Ocean Policy and the Pew Oceans Commission. Our 2013 report, Charting the Course: Securing the Future of America's Oceans, contains recommendations to improve the management of our ocean resources that are echoed here.

The Joint Initiative is highly appreciative of the progress your subcommittee has made in providing incremental but substantive additional resources to critical ocean and coastal accounts. We are acutely aware of the challenges you face addressing the funding needs of all the programs within the jurisdiction of your subcommittee. The Joint Initiative believes a continued commitment to protecting base funding and core programs at the National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), and National Aeronautics and Space Administration (NASA) that help manage, protect, and better understand our Nation's oceans and coasts and the Arctic is an investment in the future of our country that will provide significant economic, social, ecological, and national security benefits. Among the many ocean and coastal programs under your jurisdiction, we urge that maintaining and increasing investment in the following programs be prioritized in fiscal year 2016 appropriations.

COASTAL RESILIENCE

The Joint Initiative strongly supports increasing NOAA's overall budget to $6 billion, and in doing so maintaining the recent trend toward balancing NOAA's portfolio to emphasize ocean and coastal priorities. For example NOAA's National Ocean Service (NOS) would be increased in NOAA's fiscal year 2016 budget by nearly $60 million to $574 million. Specifically, within NOS, we ask you to consider funding the Regional Coastal Resilience Grant program consistent with NOAA's fiscal year 2016 budget request at $50 million, a $45 million increase from the fiscal year 2015 proposal. An important element of this program is its ability to provide competitive funding to support multi-State regional ocean partnerships that coordinate data sharing and decisionmaking across jurisdictions, implement innovative solutions to shared priorities, and effectively engage ocean and coastal stakeholders.

These partnerships are increasingly critical as States and communities confront challenges such as ocean acidification, sea level rise, competing demands for ocean resources, burgeoning populations along our coasts, and increasing threats from extreme weather events. Resilient coastal communities are not only able to minimize loss and negative impacts to life, property, and the coastal ecosystem, they are also able to quickly return residents to productive activities and restore essential services. This is imperative to facilitating full and timely economic, social, and environmental recovery. Fully funding this program will enable NOAA and its partners to address a suite of challenges, including a more efficient application of limited resources to ensure the health of our oceans and coasts.

OCEAN ACIDIFICATION

The Joint Initiative believes the inclusion of $30 million in the NOAA budget for the Integrated Ocean Acidification program is essential to help us begin to address the chemistry, variability, and impact of acidification on the marine environment. Ocean acidification is a global problem needing global solutions, and it is occurring along every shoreline in the United States. While shellfish and coral reefs receive most of the attention related to ocean acidification, fisheries, aquaculture, and coastal ecosystems and economies around the Nation will be greatly affected. Funding the Integrated Ocean Acidification program at NOAA at increased levels will allow us to measure and assess the emerging threat of ocean acidification, better understand the complex dynamics causing and exacerbating it, work to determine its impact, and develop mechanisms to address it.

ARCTIC

The Joint Initiative recommends that Congress make a significant investment through the fiscal year 2016 appropriations bill toward implementation of the National Strategy for the Arctic Region. This will support the United States chairmanship of the Arctic Council over the next 2 years, and lay the groundwork for sound international management of the region while protecting a sensitive and rapidly changing ecosystem. Increased funding for Federal agencies operating in the Arctic, such as NOAA and NSF, is essential to our international leadership in the region and will enable cross-cutting efficiencies with the Coast Guard, the Navy, and the Department of the Interior.

The Joint Initiative is convening an Arctic Ocean Leadership Roundtable with U.S. Arctic leaders and key stakeholders from multiple sectors to generate ideas for how local, State, and regional work can inform and influence national policy with

regard to Arctic ocean and coastal issues. Many of the ideas generated in this forum can be implemented with increased investment in the Arctic. Such investment can also encourage better collaboration with State and local governments, Alaskan Native leaders, and industry to improve the ability of commercial entities to operate safely in the region and ensure effective response and recovery in the event of a natural or human-caused disaster. This includes improving coordination and data-sharing on oil spill planning, preparedness, and response, vessel tracking, and search-and-rescue, as well as investment in new icebreakers, aircraft, and shore-based infrastructure. Additionally, funding Arctic-related programs at NOAA enables a range of important services essential to our understanding of the Arctic including ocean observation services, weather and sea ice predictions, mapping and charting, and sound management of marine resources.

SUSTAINED OCEAN OBSERVATIONS

We are strongly supportive of enhanced capabilities for NOAA's Office of Oceanic and Atmospheric Research (OAR), the Integrated Ocean Observing System, and similar programs at NSF. Specifically we ask you to consider funding OAR at $500 million to support the continued and enhanced operations of this vital program. This funding is central to NOAA's ability to accurately forecast weather, enable communities to plan for and respond to climate events such as flooding and drought, and protect and manage the Nation's coastal and ocean resources.

Funding NOAA's Sustained Ocean Observations and Monitoring program under this account at $42 million will provide information essential for accurate forecasting of hurricanes, typhoons, flooding, heat waves, and wildfires. For example, data and analyses of ocean and atmospheric conditions are increasingly used for drought early warning systems, enhanced tsunami warning systems, and storm surge monitoring. Ocean observations are also imperative for calibrating and validating satellite observations. Maintaining baseline ocean observations in support of weather and regional predictions, fisheries management ecosystem studies, tide and current monitoring, and sea level change is essential. Sustained ocean observations will help maintain the continuity of long-term data sets that are essential for ensuring that communities are able to respond and adapt to a rapidly changing world, both today and into the future.

SUSTAINABLE FISHERIES

In 2006 Congress made the bold decision to end overfishing once and for all by amending the Magnuson Stevens Fisheries Conservation and Management Act to require annual catch limits and associated accountability measures to be implemented for all federally managed fisheries. Through the commitment and tireless efforts of our fishermen, fishery management councils, scientists and managers, the U.S. is poised to achieve this historic milestone in natural resource management. With the investment in stock assessments, cooperative research and innovation, and science-based management, the U.S. model of fisheries management has become an international hallmark for addressing the ecological and economic sustainability challenges facing global fisheries. The Joint Initiative supports domestic and international efforts to fully implement the recommendations in the Presidential Task Force on Combating IUU Fishing and Seafood Fraud, along with similar efforts for enhanced enforcement like the Trans-Pacific Partnership. The end of chronic overfishing means healthier ocean ecosystems and a brighter future for fishermen and coastal communities. The Joint Initiative asks the subcommittee to consider restoring funding for NOAA's National Marine Fisheries Service (NMFS) at the requested level of $990 million, allowing it to continue movement towards sustainable management of fish stocks within the U.S. Exclusive Economic Zone.

OCEAN EXPLORATION

The Joint Initiative appreciates the subcommittee's long standing support of ocean exploration at NOAA and requests that you provide $28 million for the Ocean Exploration program, consistent with funding in fiscal year 2015, to increase the pace, scope, and efficiency of exploration. This would be $9 million above the NOAA budget request for fiscal year 2016. A bipartisan effort since inception, the Ocean Exploration program was strongly endorsed by Congress when created in 2002. The program has greatly contributed to our knowledge of the ocean, producing Arctic surveys which enabled the U.S. to argue for an extension of our own Exclusive Economic Zone; baseline characterization of the *Deepwater Horizon* site in the Gulf before and after the oil spill; discovery of new gas hydrates stretching from Cape Cod to Cape Hatteras, with implications for coastal hazards and ocean acidification; and new fishery habitat maps off the Northeast.

SCIENCE, RESEARCH, AND EDUCATION

The Joint Initiative calls attention to the need for consistent and dedicated funding for ocean science, research, and education. We ask you to increase funding for ocean science infrastructure, research, and grant programs at NOAA, NSF, and NASA that are working to improve our understanding of critical physical and biological ocean processes. These programs provide local, State, and national decision makers with the information they need to make informed decisions. The Joint Initiative also urges you to fund education programs at increased levels. Ocean education efforts are critical for cultivating current and future ocean stewards, especially given the growth in careers that require ocean-related education and knowledge.

In particular, we encourage you to provide $7.7 billion for the NSF, including $1.365 billion for the Geosciences Directorate and its Division of Ocean Science. NSF's investment in the geosciences has spurred innovations, addressed important national and global challenges, spurred new economic sectors, and led to the development and implementation of advanced technologies that save lives, protect property, and support our economy. For example, investments supporting basic research in mathematics, physical sciences, computer sciences, and geosciences, have led to the development of sophisticated models, satellites, radar, and instrumentation that has greatly improved hurricane forecasting, now allowing for nearly a week of preparations by cities, businesses, institutions, and undoubtedly saving lives.

We also urge $1.95 billion in funding for the NASA's Earth Science Division, up from $1.77 billion in fiscal year 2015 to support critically important ocean and coastal science and education. NASA satellites can view Earth as a planet and enable the study of it as a complex, dynamic system of diverse components: the oceans, atmosphere, continents, ice sheets, and life. Through partnerships with agencies that maintain forecasting and decision support systems, NASA improves national capabilities to predict climate, weather, and natural hazards; manage resources; and support the development of environmental policy.

CONCLUDING REMARKS

The Joint Initiative greatly appreciates your commitment to stretching scarce resources to address the challenges of a maritime nation. We will continue to track progress in advancing key ocean and coastal programs and accounts in fiscal year 2016 and beyond. Recommendations from "Charting the Course" and other reports from the Joint Initiative identify specific areas of achievement and deficiency. Implementation of the recommendations will secure the future of our Nation's ocean ecosystems, and the critical resources they provide, and ensure that they will be abundant and able to support America's ocean, coastal, and Great Lakes economies and the jobs and communities on which our Nation depends.

Thank you for considering our requests as the subcommittee begins it fiscal year 2016 appropriations process. The Joint Initiative appreciates your attention to this matter and stands ready to assist you in advancing positive and lasting changes in the way we manage our Nation's oceans and coasts.

Joint Initiative Co-Chairs and Leadership Council Members

The Honorable William Ruckelshaus | The Honorable Norman Mineta

Frances Beinecke | Don Boesch | Lillian Borrone | The Honorable Norm Dicks
Quenton Dokken | Vice Admiral Paul Gaffney | Robert Gagosian | Sherri Goodman
Scott Gudes | The Honorable Conrad Lautenbacher | Margaret Leinen
Christopher Lischewski | The Honorable Jane Lubchenco | Julie Packard
The Honorable Leon Panetta | John Pappalardo
The Honorable Pietro Parravano | Diane Regas
Randy Repass | Andrew Rosenberg | The Honorable Christine Todd Whitman

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PREPARED STATEMENT OF THE NATIONAL ASSOCIATION OF MARINE LABORATORIES

The National Association of Marine Laboratories (NAML) is pleased to submit testimony to the subcommittee with a series of recommendations that we believe would strengthen the Nation's research and education enterprise. NAML is a nonprofit organization representing the ocean, coastal and Great Lakes interests of member lab-

oratories that employ thousands of scientists, engineers and professionals nationwide. NAML labs conduct high quality research and education in the natural and social sciences and translate that science to improve decisionmaking on important issues facing our country. NAML's priorities are drawn from and strongly support two important reports from the National Academy of Sciences. They are: *Sea Change: 2015–2025 Decadal Survey of Ocean Sciences (DSOS); and Enhancing the Value and Sustainability of Field Stations and Marine Laboratories in the 21st Century.* Specific priorities germane to NAML labs are:

—Enhance science, education and public engagement at marine labs by supporting the continued development of their unique assets and qualities that allow them to prepare the next generation of scientists, expand opportunities for active learning and collaborative research, and explore a wide range of approaches to engage the public. This includes strong sustained support for competitive merit-based ocean, coastal, and Great Lakes research provided by relevant Federal agencies to address the research priorities identified in DSOS;

—Promote a network for discovery and innovation via Federal and non-Federal support to build and maintain a modern infrastructure for research, education, and networking including advanced Internet connectivity and cyber infrastructure;

—Pursue financial sustainability by developing business plans that foster the unique value of marine labs, creating mechanisms to establish reliable based funding, and diversifying approaches to obtain supplemental support—such as a national partnership program to co-locate Federal scientists and infrastructure at NAML facilities; and

—Develop metrics for demonstrating the impact of marine labs in research, education, and public engagement.

THE ROLE OF MARINE LABORATORIES IN THE NATION'S RESEARCH AND EDUCATION ENTERPRISE

"Field stations are national assets formed by the unique merger of natural capital, intellectual capital, social fabric, and infrastructure that leads to the important scientific endeavors required if we are to understand our rapidly changing natural world". Enhancing the Value and Sustainability of Field Stations and Marine Laboratories in the 21st Century.

Ocean, coastal and Great Lakes marine laboratories are vital, place-based "windows on the sea." They connect communities with cutting edge science, while providing students and citizens with meaningful learning experiences. The members of NAML work together to improve the quality and relevance of ocean, coastal and Great Lakes research, education and outreach. NAML seeks support for the following activities:

—The conduct of basic and applied research of the highest quality, making use of the unique capabilities of coastal laboratories in conducting education, outreach and public service;

—Balanced support of research with infrastructure with particular emphasis on cost-effective networking of capabilities;

—Encouragement of effective management and conservation of marine and coastal habitats and resources using ecosystem-based management approaches that restore ecosystem health;

—Observing systems that collect data needed to improve predictions of natural and human caused disasters and support the management of marine resources for the benefit of environmental and human health needs; and

—Education and training.

OCEANS, COASTS AND GREAT LAKES ARE VITAL FOR ECONOMIC GROWTH AND THE WELL-BEING OF THE NATION

More than half of the United States population lives in coastal counties that generate 58 percent ($8.3 trillion) of the Nation's gross domestic product (GPD). In 2011, Americans, on average, ate 15 pounds of fish and shellfish per person—4.7 billion pounds all together—making the U.S. second in the world in total seafood consumption. Offshore oil production in the U. S. Exclusive Economic Zone accounts for 24 percent of the total U.S. crude oil production. If American coastal watershed counties collectively comprised a single country, that country would have a GDP higher than that of China. The United States has jurisdiction over 3.4 million square miles of oceans—an expanse greater than the land area of all 50 States combined. This is a dynamic area that offers a mosaic of biologically diverse habitats that provide a wealth of environmental resources and economic opportunities, while at the same exposing human and biological communities to hazards such as dam-

aging tsunamis and hurricanes, industrial accidents and outbreaks of water borne pathogens. The 2010 Gulf of Mexico *Deepwater Horizon* oil spill and Sandy in 2012 are vivid reminders that the depth of our understanding of our oceans and coastal areas, and our ability to protect them, is far from complete. Developing sufficient capabilities to sustain ocean-based economies and protect our coasts and coastal communities from natural and man-made hazards requires a sustained, balanced investment in research, infrastructure, education, and training.

The Great Lakes region boasts a massive geographic footprint, and is a major driver of the North American economy. With economic output of $4.7 trillion in 2011, the region accounts for 28 percent of combined Canadian and U.S. economic activity. By comparison, the region's output ranks ahead of Germany, France, Brazil and the U.K., and it would rank as the fourth largest economy in the world if it were a country, behind only the U.S., China and Japan. The Great Lakes are responsible for nearly 1 million manufacturing jobs; 217,000 jobs in tourism and recreation; over 100,000 in shipping; over 110,000 in agriculture, fishing and food production and about 10,000 related to mining. Understanding the complexity of the Great Lakes is vital for the future health and well being of this region of the country.

INVESTING IN RESEARCH

NAML believes America is driven by innovation—advances in ideas, products and processes that transform existing economies, create new industries and jobs, and contribute to our Nation's ecological and economic health and security. It is essential that the Nation reaffirms and revitalizes the unique partnership that has existed between the Federal Government, the States, business and the Nation's research and education enterprise. Investing in the Nation's research enterprise has contributed significantly to our long-term prosperity and technological pre-eminence through research spanning a landscape of disciplines, from physics to geology, chemistry to biology, engineering to social sciences, and observing to modeling. NAML believes that research and education programs at the major Federal science agencies with ocean and coastal responsibilities should be viewed as priority investments in the future health and well being of the Nation. Much attention has been focused justifiably on the need for our Nation to continue its support of premier basic research programs. It is also important to maintain strong support for mission-oriented ocean, coastal and Great Lakes research that includes long term observing programs. Research programs that enhance agency missions and support the extramural community in competitive, merit-based research provide highly cost-effective returns on investment and distribute economic and societal benefits over a broad array of communities. Further, NAML believes that developing exchange programs between Federal agencies and marine laboratories will further strengthen the communication and capacity of both for the benefit of the ocean science and management enterprise.

Programs that support the extramural community via competitive, merit-based research provide highly cost-effective returns on investment, leverage additional resources to meet science and management priorities, and distribute economic and societal benefits over a broad array of communities. While the National Oceanic and Atmospheric Administration (NOAA) has acknowledged his assertion on many occasions, its extramural support for its partners has continued to decline relative to the agency's bottom line. From background information developed for the NOAA Science Advisory Board's R&D Portfolio Review Task Force support by the Office of Oceanic and Atmospheric Research (OAR) for extramural R&D has declined by $60 million since 2005—from $171.6 million to $107.1 million while the percentage of OAR's research activities to support extramural programs has dropped from just over 50 percent down to 34 percent of the total. In the National Ocean Service (NOS), support for extramural R&D has declined from a level of $21.6 million in 2005 to $13.7 million in 2011 while intramural support has grown from a level of $53 million in 2005 to a level of $58 million in 2011. Moreover NOAA has repeatedly proposed the termination of numerous extramural programs—such as the John H. Prescott Marine Mammal Grants program—and the consolidation of research programs—such as Ocean Exploration and Research—which has led to the dramatic reduction in extramural research and education support.

Beyond cutting back on its extramural support, NOAA now seeks permission to "receive and expend funds made available by, any . . . private organization, or individual (proposed Section 108 of the General Provisions in the NOAA Section of the *Appendix to the Fiscal Year 2016 Budget,* page 218)." This would enable NOAA to compete against non-Federal and private entities for private sector support. Thus not only is NOAA cutting back its own support, it intends to further exacerbate the situation by competing against its partners for the limited available non-Federal re-

sources needed to fill the gaps created by NOAA's decision to scale back its extramural support. NAML urges the subcommittee to restore to the maximum extent possible NOAA support for its extramural research, education, and other related programs while also limiting NOAA's ability to compete with the private sector for non-Federal resources needed for research, education, and conservation programs.

INVESTING IN RESEARCH INFRASTRUCTURE

NAML believes that a comprehensive range of ocean and coastal research infrastructure is essential to meet growing demands for scientific information and to ensure that we restore and maintain ecosystem health to support safe, efficient, and environmentally sustainable use of our ocean, coastal and Great Lakes resources. Most marine laboratories operate independently of one another. Greater networking with other marine laboratories, field stations, and other research centers would leverage resources to facilitate discovery and spark innovation. Networking would also allow institutions to share best practices, protocols, and platforms for data archiving and retrieval. Such networking has the potential to open new arenas of scientific inquiry, education, and outreach. It can capture social and intellectual capital to tackle major questions and seize opportunities as no single marine laboratory can, and it enhances creativity and innovation by attracting a wide range of scientists and promoting multidisciplinary collaboration. The most successful and sustainable networks start small and are self-defining; they encourage reciprocity among network members. Networking can facilitate the development and diffusion of knowledge and technology in a way that encourages innovations. It is also important to appreciate that marine laboratories vary in scope, size, infrastructure requirements, and purpose; each contributes to the global portfolio in distinct ways. Internet connectivity and cyberinfrastructure are two neglected and underdeveloped elements of infrastructure. One common element, however, in need of attention is Internet connectivity and cyberinfrastructure, which would facilitate data sharing and analysis. Installation of new cyberinfrastructure requires data-management and data-sharing plans and conformity of data with widely used metadata standards. Such infrastructure also requires a long-term funding commitment for repair, upgrades, and technical support.

INVESTING IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) EDUCATION

NAML's education mission is two-fold. First, it is to enhance ocean STEM education to ensure that all citizens recognize the reciprocal effects of the oceans, coasts and Great Lakes on their own lives and the impacts citizens have on these environments. Second, it is to provide formal research and training opportunities at K–12, college, and post-graduate levels to ensure a scientifically savvy, technically qualified, and ethnically diverse workforce capable of solving problems and answering questions related to the protection, restoration and management of coastal and ocean ecosystems, climate variability, and societal needs. An informed and engaged public is essential for the Nation to address complex ocean- and coastal-related issues, balance the use and conservation of marine resources, and maximize future benefits from the ocean. Public understanding of human impacts on the marine environment should be balanced with recognition of the benefits to be derived from well-managed ocean resources. Ocean-related education is by its nature interdisciplinary, involving many of the natural sciences and the human connection to natural resources. It can increase overall science literacy and enhance the Nation's health, standing, safety and security. NAML laboratories seek to expand the engagement of individuals from groups that have been historically under-represented in ocean research, education and outreach. This is particularly important in fulfilling the goal of achieving a diversified STEM pipeline to meet future science and ocean workforce needs.

NAML remains concerned with the administration's STEM Education Consolidation proposal for fiscal year 2016. A total of 20 STEM education programs at eight key R&D mission agencies (including the National Oceanic and Atmospheric Administration, National Science Foundation, and National Aeronautics and Space Administration) will be impacted by this proposal. It is important for mission agencies to help support the next generation of scientific and technical talent—much of which will be needed by these agencies in future years. We urge the subcommittee to reject these consolidation proposals and support the continuation of these programs within their current agencies.

NAML appreciates the opportunity to present these views to the subcommittee as it begins work on the development of the fiscal year 2016 appropriations bill.

Thank you.

PREPARED STATEMENT OF THE NATIONAL CONGRESS OF AMERICAN INDIANS

On behalf of the National Congress of American Indians (NCAI), this testimony addresses important programs in the Department of Justice and Department of Commerce. NCAI is the oldest and largest American Indian organization in the United States. Tribal leaders created NCAI in 1944 as a response to termination and assimilation policies that threatened the existence of American Indian and Alaska Native tribes. Since then, NCAI has fought to preserve the treaty rights and sovereign status of tribal governments, while also ensuring that Native people may fully participate in the political system. As the most representative organization of American Indian and Alaska Native tribes, NCAI serves the broad interests of tribal governments across the Nation. As Congress considers the fiscal year 2015 budget and beyond, leaders of tribal nations call on decision-makers to ensure that the promises made to Indian Country are honored in the Federal budget.

INTRODUCTION

Annual funding decisions by Congress are an expression of our Nation's moral priorities. Numerous treaties, statutes, and court decisions have created a fundamental contract between tribal nations and the United States: tribes ceded millions of acres of land that made the United States what it is today, and in return tribes have the right of continued self-government and the right to exist as distinct peoples on their own lands. And for its part, the United States has assumed a trust responsibility to protect these rights and to fulfill its solemn commitments to Indian tribes and their members.

Part of this trust responsibility includes basic governmental services in Indian Country, funding for which is appropriated in the discretionary portion of the Federal budget. Tribal governments exist to protect and preserve their unique cultures, identities, and natural environments for posterity. As governments, tribes must deliver a wide range of critical services, such as education, workforce development, and first-responder and public safety services, to their citizens. The Federal budget for tribal governmental services reflects the extent to which the United States honors its promises to Indian people.

DEPARTMENT OF COMMERCE

Provide $35 million for the Minority Business Development Agency (MBDA).—Created by Executive Order in 1971, the MBDA was established to support minority business development centers and received funding of almost $63 million to carry out this mission. Since then, MBDA's funding has shrunk by over 50 percent to an estimated $30.5 million for fiscal year 2013 and $29.3 million for fiscal year 2014. After MBDA revamped its cooperative assistance grants to Minority Business Centers (MBCs), the Native American Business Enterprise Centers (NABECs) were eliminated and their services were consolidated with the MBCs. About $13 million of MBDA's budget is disbursed to the MBCs to provide business consulting; advice on business financing; and some procurement technical assistance to minority businesses, entrepreneurs, and tribal enterprises.

With the service gap created by the elimination of NABECs, the need for an increased level of funding for MBDA is even greater. MBDA must sustain and expand support for these centers, which provide important assistance to businesses that help them grow and develop, thereby creating a stronger private sector and healthier national economy. The MBDA also supports minority contractors' teaming efforts to pursue Federal contracts, directs efforts to track minority business data, collaborates with the Office of Native American Affairs, and is increasing its focus on global trade.

Fund the Office of Native American Affairs (ONAA) at a minimum of $1.25 million as part of the Commerce Department Management Budget.—In the late 1990s, the Secretary of Commerce established ONAA within the Secretary's office that was codified by the enactment of the Native American Business Development, Trade Promotion and Tourism Act of 2000 (Public Law 106–464) (the 2000 Act). Since then, funding for the Office has been partial and very limited. In order to carry out its mission, ONAA must receive adequate support to implement Indian policy initiatives and expand Native American business development initiatives both domestically and internationally. Funding made available through Commerce's Departmental Management budget would help ONAA's efforts, particularly given the reduced focus of MBDA on specific Native American business assistance.

CONCLUSION

Thank you for your consideration of this testimony. For more information, please contact Virginia Davis, Senior Policy Advisor, at vdavis@ncai.org, NCAI Budget and Policy Analyst, at aebarb@ncai.org or Brian Howard, Legislative Associate, at bhoward@ncai.org.

PREPARED STATEMENT OF THE NATIONAL ESTUARINE RESEARCH RESERVE ASSOCIATION

Chairman and members of the subcommittee, my name is William Reay and I am the Director of the Chesapeake Bay National Estuarine Research Reserve in Virginia, administered by the Virginia Institute of Marine Science, College of William and Mary. I submit this testimony in my capacity as President of the National Estuarine Research Reserve Association (NERRA). NERRA is a not-for-profit scientific and educational organization dedicated to the protection, understanding, and science-based management of our Nation's estuaries and coasts. NERRA appreciates the support this subcommittee has given to the research reserves over the years. As a result, the research reserves have been able to assist coastal communities and States in becoming more resilient to the ever increasing and complex challenges they face on a daily basis and into the foreseeable future.

For fiscal year 2016, NERRA strongly recommends the following reserve system programs and funding levels within the National Oceanic and Atmospheric Administration (NOAA):

NERRS Operations	$23.9 million
NERRS Procurement, Acquisition, and Construction (PAC)	$1.7 million

The National Estuarine Research Reserve System (NERRS) program bring the strength of both NOAA and partner science and stewardship to important coastal regions across the Nation. NERRS encompasses 28 protected reserves located in estuaries that are home to our most productive habitats and populated communities—that support science-based coastal resource management, research, and education to meet national priorities as mandated by Congress in the Coastal Zone Management Act (CZMA) of 1972. The States have been entrusted to operate and manage NOAA's program in 22 States and Puerto Rico, where over 1.3 million acres of land and water are protected in perpetuity. What distinguishes the research reserves is the community and State implementation of programs and local management of these places that form this Federal-State partnership program.

The administration's fiscal year 2016 request for the NERRS is a total of $21.3 million. This amount will result in a reduction of funding to each State, and will diminish the current capabilities of the program's core operations. Specifically, the administration's request will decrease funding amounts going to each State; reduce water quality monitoring capabilities that coastal dependent communities, businesses and industries rely on; adversely impact the collection of data relating to hazards and sea level rise provided to decision-makers; and, reduce the education and information exchange provided to communities and schools related to coastal resiliency. After reviewing the detailed NOAA budget request sent to the Congress, it is clear that States are inadequately supported to implement this national program and are compromised in their ability to fulfill the vision of Congress in its creation of the NERRS program.

NERRA is deeply concerned with the administration's funding levels that we believe are inconsistent with key tenants of NOAA's own strategic plan—specifically, enhancing community and economic resiliency and strengthening science in support of coastal resource management. The administration's fiscal year 2016 requested funding level will diminish the NERRS's capacity to deliver important research, monitoring data, and education and training to its State, local, and regional partners.

The NERRS program has grown as States identify the coastal needs that must be addressed, and the addition of new reserves has provided more science, training, and education resources that can be applied nationally. At issue is the cost associated with operating 28 reserves nationally has increased given the relatively recent addition of two reserves (Texas and Wisconsin) and a third (Hawaii) in fiscal year 2016, the infrastructure it relies on has aged, and because there is a rapidly increasing need to help local communities address coastal hazards. Without funding, four critical core program areas are at risk.

ESSENTIAL COASTAL RESILIENCY NERRS PROGRAMS IMPACTED BY INADEQUATE FUNDING

1. *Reserve Operations*.—First, the administration budget request flat-funds the program at the fiscal year 2015 level of $21.3 million. Flat-funding in the face of the program adding a 29th reserve in fiscal year 2016 will in effect result in reduced budgets for each of the current reserves. The addition of a new research reserve strengthens the national program by leveraging science, education, and partnerships that will benefit the Nation. Equally troubling is the absence of any mention of the expected expansions in NOAA's fiscal year 2016 budget submission. Along with the new Hawaii reserve, there is one more known—Connecticut—in process for future years.
2. *Coastal intelligence—monitoring and data networks*.—The second program area at risk is maintaining existing System-wide monitoring and data networks that provide immediate and long-term information to understand harmful algal blooms, assess water quality, identify habitat impacts from changing sea levels, aid in weather forecasting, and improve response to storm surge. Hundreds of entities use the NERRS water quality and weather data, including State water quality control programs; county health departments; shellfish growers and fishing industry professionals; the National Weather Service; and, insurance companies.
3. *Sentinel sites provide early detection of change*.—The third program area at risk is helping communities by providing data for early detection of habitat change that helps respond to coastal hazards by integrating monitoring, analysis and modeling to assess current habitat vulnerability, forecast future conditions and aid in the development of adaptive management strategies. Right now reserves are working to understand changes in tidal marshes, mangroves and sea grass beds. These habitats provide a wide range of highly valued ecosystem serves such as nursery habitat for commercial and recreational important fish, erosion and flood control, and water quality improvements.
4. *Educating today's and tomorrow's decision-makers*.—The forth program area at risk is providing relevant and timely science and support tools to decision-makers and to the next generation of scientists, resource managers, business people, and civic leaders. Reserves have prioritized the Teachers on the Estuary professional development opportunity for all 28 reserves that prepare the Next Generation workforce in key disciplines of science, technology, engineering and math (STEM education)—estimated to reach more than 12,000 students annually through this program alone in addition to the 83,000 reached by all education programs conducted by the reserves. Additionally reserves support their communities by providing technical training to local officials and support staff and residents about critical resource management issues such as impending hazards, storm water control, shoreline management, and habitat restoration: in 2014 more than 12,000 decision makers participated in reserve training programs.

MAKING COASTS MORE RESILIENT, SUPPORTING COASTAL ECONOMIES, AND HAVING DIRECT POSITIVE IMPACTS ON COMMUNITIES AND THROUGHOUT THE STATES

Research reserves assist our coastal communities, commercial businesses and industries through enhanced coastal resiliency in a changing environment. As severe weather events become more common, Federal, State, and local officials are recognizing that estuaries have the capacity to provide green resilience infrastructure. Through the reserves, NOAA can tailor science and management practices to enable local planners to use estuarine habitat as a tool for resilience and adaptation. The increase to the NERRS operation funds by $2.6 million above the administration's request is essential to supporting coastal economies and impacting States and their communities.

—The research reserves' operations that include existing high-quality jobs and student internship opportunities, as well as service delivery in 28 communities will be improved through modest additional appropriations by enhanced monitoring technology responsive to changing environments and increased educational efficiency by providing best-practices professional development with decision-maker training and education programs such as Teachers on the Estuary.

—Each research reserve will leverage additional State, local, and private funding to their individual States, and will provide vital local trainings for decision makers, researchers, students and teachers that generates a more resilient coast through improved access to stakeholder driven research, engaging place-based education and information needs.

—With adequate funding, essential water quality data collected by the research reserves will be made available to entities such as local commercial businesses,

industries and government entities who rely upon it via updated monitoring equipment and real-time telemetry technology.

Investments in the NERRS are dollar-smart because funding for the program is matched by the States and leveraged significantly, resulting in an average of more than five other local and State partners contributing to the work at each reserve. In addition, the program significantly benefits from volunteers that are engaged in habitat restoration, citizen science and education which offset operation costs at reserves by donating thousands of hours. Annually, volunteers contribute more than 100,000 hours to the NERRS with an estimated value of over $2.2 million. *Funding of $23.9 million for the NERRS would be a minimal level to provide each reserve with the necessary funding to insure that cuts to the States as well as to existing core programs and services do not occur.*

NERRS PROCUREMENT, ACQUISITION, AND CONSTRUCTION AND THE BAY-WATERSHED EDUCATION AND TRAINING

The NERRS Procurement, Acquisition, and Construction (PAC) funding is designated for land conservation, through acquisition of priority lands, and essential facilities construction and upgrades. This competitive funding program is matched by State funds and has resulted in not only the preservation of critical coastal lands as described above, but also in the increase of construction jobs. For example NERRS creates more than 60 jobs for each $1 million of Federal construction (PAC) money spent. In addition, NERRS leveraged investments of more than $115 million to purchase over 30,000 acres of coastal property over the last 12 years.

Second, within the budget request for NOAA, the administration is again proposing the elimination of funding for the Bay-Watershed Education and Training (B–WET) regional programs—a reduction of $7.2 million in funding. The rationale provided for program reductions is misleading in stating that NOAA education experiences will continue to be provided by programs including the NERRS. Where States are eligible for B–WET funding, reserves are able to increase their educational capacity by as much as 50 percent, as documented in the Chesapeake Bay NERR (VA) for example. The B–WET regional program funding is money that is spent in addition to the annual NERRS money invested in the education programs. The NERRS educate more than 83,000 children annually. *NERRA strongly opposes the cut of B–WET regional programs and any of the other NOAA STEM educational programs.*

CONCLUSION

NERRA greatly appreciates the past support the subcommittee has provided. This support is critical to sustain and increase the economic viability of coastal and estuary-based industries.

With NERRA's fiscal year 2016 request of $23.9 million for the NERRS Operations and $1.7 million for NERRS PAC, the program will be able to maintain delivery of credible scientific research and translation of that research so as to contribute to the resiliency of the natural and built communities and that yields a high rate of return to the 28 reserves around the country. We urge the subcommittee to support this request, and to restore funding for the B–WET regional programs.

Thank you for the opportunity to present these remarks. On behalf of NERRA, I would be happy to answer questions or provide additional information to the subcommittee.

PREPARED STATEMENT OF THE NATIONAL MARINE SANCTUARY FOUNDATION

The National Marine Sanctuary Foundation (NMSF) works with Congress and the National Oceanic and Atmospheric Administration (NOAA) to connect fellow citizens to the underwater places that define the American ocean—the National Marine Sanctuary System. We remain concerned that NOAA's Office of National Marine Sanctuaries (ONMS) has not received sufficient appropriations for several budget cycles. Recognizing the economic growth and job creation benefits provided by sanctuaries, NMSF respectfully requests the subcommittee remedy this situation by appropriating:

—$55 million to the Sanctuaries and Marine Protected Areas Base, within NOAA's Operations, Research, and Facilities account; and

—$5.5 million to the National Marine Sanctuary Program—Construction/Acquisition Base, within NOAA's Procurement, Acquisition, and Construction account.

Joining NMSF in this request is a national network of community-based, nonprofit organizations that support sites within the sanctuary system. On behalf of

their members, the Cordell Marine Sanctuary Foundation (California), Farallones Marine Sanctuary Association (California), Friends of Thunder Bay National Marine Sanctuary (Michigan), Gray's Reef National Marine Sanctuary Foundation (Georgia), Hawai'i National Marine Sanctuary Foundation (Hawaii), California Marine Sanctuary Foundation (California), and Sanctuary Friends Foundation of the Florida Keys (Florida) support funding the National Marine Sanctuary System at these levels (Appendix I).

And with the opening of the sanctuary nomination process, communities nationwide are voicing their support for increased funding for the National Marine Sanctuary System.

Despite a decade's worth of bipartisan support in both houses of Congress that sanctuaries warrant additional funds and the groundswell of public support, the President's fiscal year 2016 budget request continues a disturbing trend of underfunding the sanctuary program. While we recognize the challenges of providing increased funding in the current budget climate, we believe that it fails to address critical sanctuary contributions to job creation and economic growth.

THE NATIONAL MARINE SANCTUARY SYSTEM AND NOAA'S OFFICE OF NATIONAL MARINE SANCTUARIES

Encompassing over 170,000 square miles of marine and Great Lakes waters, the National Marine Sanctuary System includes 13 national marine sanctuaries and Papahānaumokuākea Marine National Monument. Sanctuaries protect vibrant ocean ecosystems, conserve essential habitat for endangered and commercially important marine species, and safeguard historical and cultural resources.

NATIONAL MARINE SANCTUARIES ARE UNIQUE AND SUCCESSFUL OCEAN CONSERVATION TOOLS

Generations of Americans have grown up, worked jobs, and supported their families on the waters of our national marine sanctuaries. Among all the statutes enacted by Congress to govern ocean resources, the National Marine Sanctuaries Act stands alone in terms of the comprehensiveness, community participation, transparency and balanced approach provided for all stakeholders. An independent legal analysis concluded that "the National Marine Sanctuaries Act is the best existing mechanism available for preserving ocean ecosystems," due to sanctuaries' commitment to public participation, community engagement, and use of a place- and ecosystem-based approach.[1]

Unlike other ocean resource laws, the National Marine Sanctuaries Act protects nationally significant places and their natural, historical, and cultural riches. Experience shows that this approach is vital to maintaining the healthy seascapes that underpin our productive economies, supporting thousands of businesses while maintaining public access for recreation, science, exploration, and education.

NATIONAL MARINE SANCTUARIES ARE ECONOMIC ENGINES FOR COASTAL COMMUNITIES

Sanctuaries foster economic growth, support jobs and businesses, generate billions of dollars in local revenue, preserve underwater and maritime treasures, and provide valuable public access for ocean recreation, research, exploration, and education. According to the National Ocean Economics Program, 70 percent of ocean and coastal employment in the tourism and recreation sector depend on visitor opportunities requiring clean beaches, clean water, and abundant fish and wildlife promoted by national marine sanctuaries.

Because of strong ties to the local communities, businesses, and organizations, sanctuaries are able to heavily leverage private funds and contributions for taxpayer benefits, ensuring that the benefits of funding national marine sanctuaries far outweigh the Federal outlays that support them:

—Over 64,000 jobs and $4.5 billion in GDP contributed annually from the marine tourism and recreation sector in the two counties adjacent to Florida Keys National Marine Sanctuary.[2]

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[1] Perkins Coie LLP. (2013). "Area-Based Management of Marine Resources: A Comparative Analysis of the National Marine Sanctuaries Act and Other Federal and State Legal Authorities." Available: http://www.nmsfocean.org/files/ABMReport.pdf.

[2] National Ocean Economics Program. (2011) "Ocean Economy Data." Available: http://www.oceaneconomics.org.

—Over $126 million in whale watching revenue and 600 jobs at 31 businesses resulting from less than $2 million invested in the Stellwagen Bank National Marine Sanctuary off of Massachusetts.[3]
—2,100 jobs and a $291 million budget from marine science and education at the Monterey Bay National Marine Sanctuary, more than 100 times the $3 million investment by taxpayers.[4]
—Over half (58 percent) of visitors to Alpena, Michigan came to visit Thunder Bay National Marine Sanctuary, which is the region's most popular attraction, boasting nearly 100,000 visitors per year.[5]

NATIONAL MARINE SANCTUARIES START AND STAY IN LOCAL COMMUNITIES

Public participation is a hallmark of the sanctuary program. From the sanctuary nomination process to day-to-day management decisions, sanctuaries start and stay in local communities—underscoring ONMS's commitment to community leadership and engagement. Communities have a controlling influence on sanctuary priorities to ensure unique, local circumstances are addressed. Sanctuary rules and regulations are developed on a site-by-site basis, and, from the outset, sanctuaries are designed to accommodate multiple uses of the ocean.

Sanctuaries are created by and for the people: citizens and communities around the Nation recognize the benefits of sanctuaries and express strong interest in establishing sanctuaries in their own waters.

—Over 440 community representatives serve on Sanctuary Advisory Councils with members from the fishing, tourism, and maritime commerce industries; tribes, State and local government; and scientists, educators, and conservationists to provide advice to sanctuary superintendents on sanctuary operations.
—Over 140,000 hours are contributed by local sanctuary volunteers each year in areas of research, monitoring, enforcement, education and outreach, and management advisory.

NATIONAL MARINE SANCTUARIES AND EDUCATION

Through education and outreach programs, sanctuaries function as living classrooms that provide students with the knowledge and tools to act as responsible ocean stewards. Science, technology, engineering and mathematics (STEM) education programs are a key part of national marine sanctuaries mission. Eliminating important education infrastructure, such as NOAA Office of Education's Bay Watershed Education and Training (B–WET) and NOAA's Teacher at Sea program, hinders the ability to deliver meaningful watershed education initiatives in sanctuaries.

We strongly encourage you to oppose any efforts to move or terminate the Dr. Nancy Foster Scholarship Program (NFSP). The direct connections between students and researchers in sanctuaries are critical for the effectiveness of the NFSP. While we support the administration's efforts to recognize efficiencies across STEM education initiatives, NFSP should remain administered by ONMS, as consistent with the National Marine Sanctuaries Act.

NATIONAL MARINE SANCTUARIES' PROGRAMMATIC OUTLOOK UNDER REDUCED FISCAL YEAR 2016 FUNDING LEVELS

Funding decreases and level-funding have resulted in layoffs and cutbacks to mission critical sanctuary programs. A lack of funds may result in cuts to public access and recreation opportunities, reduced operations at visitor centers, cancellation of partnerships, a lack of contingency funding needed in case of emergencies like oil spills, and additional inoperable vessels. Of particular concern are proposals to reduce funding for necessary and ongoing renovation and construction projects.

The potential impact of reducing sanctuary appropriations goes far beyond the individual sanctuaries themselves: limiting visitor center hours, eliminating research

[3] O'Connor, Simon *et al* (2009). Whale Watching Worldwide: tourism numbers, expenditures and expanding economic benefits, a special report from the International Fund for Animal Welfare. Prepared by Economists at Large. Available: http://www.ifaw.org/Publications/Program__Publications/Whales/asset__upload__file841__55365.pdf.

[4] Monterey Bay Crescent Ocean Research Consortium. (2012) "Major Marine Sciences Facilities in the Monterey Bay Crescent-2012." Available: http://web.me.com/paduan/mbcorc/Membership__Info__files/MontereyBayLabs2012-2.pdf.

[5] Source: Molnar, Lawrence. 2013. "Economic Impact Analysis for The National Oceanic and Atmospheric Administration, Thunder Bay National Marine Sanctuary, Final Report." Ann Arbor, Michigan: Institute for Research on Labor, Employment, and the Economy, University of Michigan (July). Available: http://irlee.umich.edu/Publications/Docs/ThunderBayNMS__FinalReport.pdf.

programs, and diminishing enforcement capacities prevents ONMS from fulfilling its statutory mandates, while also reducing the economic activity and job creation from which healthy communities benefit. Funding sanctuaries below NMSF's recommended levels could force the program to:

Reduce public access and recreation opportunities for all Americans: Funding cuts risk the Florida Keys National Marine Sanctuary's 767 mooring buoys, which provide public access and recreational opportunities within the sanctuary while protecting coral reefs and shipwrecks from anchor damage.

Cut visitor center hours: Sanctuary visitor centers act as a public face of NOAA to over 350,000 visitors per year, including Monterey Bay National Marine Sanctuary Exploration Center (California), Mokupāpapa Discovery Center (Hawaii), Great Lakes Maritime Heritage Center (Michigan), and Florida Keys EcoDiscovery Center (Florida).

Cancel education and outreach programs that leverage private funds: Reduced funding jeopardizes education and outreach activities on the water, at sanctuaries and visitor centers, and in classrooms.

NOAA NEEDS SUFFICIENT FUNDS TO FULFILL ITS RESPONSIBILITIES TO THE AMERICAN PEOPLE

We strongly support the Friends of NOAA Coalition request to fund the agency at no less than $6 billion in fiscal year 2016. From weather forecasts to fisheries management, NOAA provides decision makers with critical data, products, and services that promote and enhance the Nation's economy, security, environment, and quality of life. Insufficient funding will only serve to diminish the economic activity and job creation that is successfully revitalizing communities across America.

JASON PATLIS,
President and CEO.

APPENDIX I

MARCH 18, 2015.

Hon. RICHARD C. SHELBY
Chairman, Senate Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies
SH–125 Hart Senate Office Building
Washington, D.C. 20510

Hon. BARBARA MIKULSKI
Vice Chairwoman, Senate Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies
SD–142 Dirksen Senate Office Building
Washington, D.C. 20510

DEAR CHAIRMAN SHELBY AND RANKING MEMBER MIKULSKI: As Congress begins negotiations on the fiscal year 2016 Commerce, Justice, Science, and Related Agencies appropriations bill, we respectfully request that you prioritize programmatic requests for:

—*Sanctuaries and Marine Protected Areas Base,* within the National Oceanic and Atmospheric Administration's (NOAA) Operations, Research, and Facilities (ORF) account, at a level of $55 million; and

—*Marine Sanctuaries Construction Base,* within NOAA's Procurement, Acquisition, and Construction (PAC) account at a level of $5.5 million.

Sanctuaries embody our Nation's commitment to conserve the best of our ocean, coasts, and Great Lakes. Through their comprehensive, highly participatory approach designed to accommodate multiple uses of our ocean, national marine sanctuaries foster economic growth, support jobs and businesses, generate billions of dollars in local revenues, preserve underwater and maritime treasures, and provide valuable public access for ocean recreation, research, exploration, and education.

The American people have seen the benefits national marine sanctuaries provide for local communities and our Nation and they are voicing their support for sanctuaries. Communities nationwide are coming together to discuss how to protect the ocean, coasts, and Great Lakes by working with the existing sanctuaries and by nominating new sites through the sanctuary nomination process.

Sanctuaries are a proven and successful conservation tool and the return on our investment in sanctuaries is simply too valuable to ignore. Because of the strong ties to the local communities, businesses, and organizations, sanctuaries have been able to heavily leverage private funds and contributions for taxpayer benefits. However, diminishing budgets will force ONMS to reduce economic opportunities, close visitor's centers, cancel collaborative partnerships with museums and universities, terminate education and research initiatives, and diminish enforcement capacities.

In particular, the sanctuary visitor centers, facilities, and vessels supported by PAC funds anchor local tourism and recreation economies and enable ONMS to complete core research, education, and law enforcement missions that simply cannot be accomplished from land alone.

We strongly urge you to remedy this situation by supporting an overall appropriation of no less than $60.5 million for sanctuaries in fiscal year 2016. Your support for national marine sanctuaries will send a powerful and necessary message about the economic growth and job creation benefits of healthy ocean and coastal resources, while simultaneously underscoring the continuing ecological and aesthetic value of America's underwater treasures.

Thank you for your consideration of this request. We wish you all the best for the 114th Congress.

Sincerely,

Jason Patlis, National Marine Sanctuary Foundation; Tom Lambert, Cordell Marine Sanctuary Foundation; Chris Kelley, Farallones Marine Sanctuary Association; Charles N. Wiesen, Friends of Thunder Bay National Marine Sanctuary; Chris Hines, Gray's Reef National Marine Sanctuary Foundation; Lynette Poncin, Hawai'i National Marine Sanctuary Foundation; Dennis J. Long, Monterey Bay and Channel Islands Sanctuary Foundation; George Neugent, Sanctuary Friends Foundation of the Florida Keys

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PREPARED STATEMENT OF THE NATIONAL WEATHER SERVICE EMPLOYEES ORGANIZATION

The employees of the National Weather Service once again urge the subcommittee to reject the administration's proposals to eliminate funding for the Information Technology Officers (ITOs) at our Nation's 122 Weather Forecast Offices, and to reduce funding for the development of the Advanced Weather Interactive Processing System, "AWIPS 2."

As this subcommittee noted when rejecting an earlier proposal to eliminate the ITOs, the "IT staff have proven to be valuable parts of the local weather forecast teams." Senate Report No. 112–158, at 31. But once again, the NOAA budget justification fails to explain how 24 regionally based ITOs can, at a distance, handle the same workload performed by 122 employees who work at the site of the problem. No workload analysis has ever been conducted. This year's budget justification contains the same preposterous claim that the regional team approach will "meet or exceed current service levels" without any factual basis or prototyping. The proposal once again claims that "the current service delivery model has redundancies," but fails to identify a single one.

The subcommittee has rejected such unsupported assurances in the past and has directed the agency to present any proposal to consolidate IT support only as part of a comprehensive plan for future NWS operations. In considering the fiscal year 2014 request, this subcommittee directed NOAA to provide a report that "addresses potential consolidation of NWS IT staff in the context of an overall workforce staffing plan." Senate Report No. 113–78, at 38. In rejecting NOAA's request to eliminate the ITOs last year, this subcommittee wrote:

> This repeated request continues to ignore the subcommittee's direction to provide perspective on how this proposal fits within NWS's broader workforce and modernization plans. The subcommittee also notes that NOAA has not provided the report requested in fiscal year 2014 outlining a multiphase plan for consolidating NWS's information technology operations that would streamline system configuration . . . while resulting in no degradation of service.

Senate Report No. 113–181, at 43. Astonishingly, NOAA has once again requested authority to eliminate the ITOs without providing the report or analysis that this subcommittee said was a prerequisite to its approval. As this year's NWS budget justification explains (at 39), the NWS has still not yet developed its IT consolidation plan and will not be "developing a strategic staffing plan which will fully show the future of the NWS workforce" until 2016. Between September 2010 and February 2015, the NWS reduced its non-supervisory workforce by 10 percent, from 3877 to 3469, in an unplanned, random manner as vacancies arose. The subcommittee should not approve additional haphazard reductions in field staff.

NWSEO has just obtained a copy of a "Statement of Need" authored by an *ad hoc* committee of Meteorologists-in-Charge ("MICs") of numerous NWS Forecast Of-

fices in 2013 and submitted to NWS management, explaining why the ITOs are essential to the operations of their offices and need to be retained. According the MICs, who are the senior supervisor at each forecast office, the "READI Teams" cannot adequately replace the ITOs:

> The READI team proposal is an admirable effort to reduce agency overhead costs and looks promising on the surface, but it also includes a large number of assumptions that have already been proven faulty or ineffective during weather situations affecting multiple sites. Having to rely on emergency backup and remote support in lieu of local site support is a recipe for disaster and one not worth the cost savings.
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> From our perspective, one cannot remove such a vital individual from a unit and replace him with a remote staff member (or members) tasked with serving multiple offices that has no collaborative ties, relationship, or rapport with the people, office or customers, and expect the kind of benefits the ITO program has produced to date.
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> * * *
>
> Moving from a system of local ITO experts to a regional cadre of ITO teams, no matter how skilled and prepared, will undoubtedly result in slower response time and longer periods of system down-time and lengthy site and system recovery.

The MICs also noted that the ITOs are responsible for far more than keeping existing systems operational. "[T]he ITO is a critical developer who is directly connected with the forecasters, end users, and core constituents. Due to this connection the position has been able to create successful applications with a positive and lasting impact on our agency." Below are four examples of software applications recently developed by ITOs that were customized to local weather conditions and customer needs.

1. Last winter Diana Norgaard, the ITO at the Sterling Forecast Office (which services Northern Virginia, Maryland, DC and part of West Virginia) developed software applications that translated winter weather forecasts and models into graphic "probabilistic" forecasts of the chances of varying snow accumulation totals for approximately 100 locations within the office's service area. She developed a Web page for display of these experimental forecast products, which can be found at www.weather/gov/lwx/winter. These new forecast products were so well received that Ms. Norgaard assisted in replicating them for the Philadelphia, New York and Boston Forecast Office Web sites this winter.

2. After the January 2014 snowstorm that paralyzed the Atlanta highway network, the Georgia Department of Transportation installed road sensors around the metro Atlanta area and North Georgia. Steve Listemaa, the ITO at the Atlanta Forecast Office, worked with the vendor to ingest this data for display into the office's AWIPS system, which he then configured to produce road temperature forecasts. The graph below shows the observed road temperature data to the left of the vertical gray line, and forecast road temperature data to the right. The display was originally written by the ITO at the Tulsa Forecast Office, and Mr. Listemaa took that code and modified it for his office's needs.

3. In Vermont, ice jams create a flood threat in late winter as river ice starts to break up; Montpelier was flooded as a result of such an ice jam in 1993. Chuck McGill, the ITO at the forecast office in Burlington, Vermont, wrote a series of software scripts that created a database for the office's hydrologist to use to log the locations of ice jams in their service area, and to quickly generate a Public Information Statement with this information.

4. The NWS's Service Assessment of its response to the May 2013 Moore, Oklahoma tornado noted that a local application developed by the ITO at the Norman Forecast Office was critical to FEMA's efforts:

> WFO Norman produced GIS [graphical information systems] products showing a preliminary estimate of the likely tornado track, which the office made available while the tornado was in progress in Moore, Oklahoma. Meteorologist in Charge (MIC), serving as the radar interpreter, worked with the Information Technology Officer (ITO) to use a prototype local application on AWIPS II, the AWIPS's next-generation software, to generate the GIS files on AWIPS. The GIS files were emailed to the EMs in affected regions and to the Southern Region Regional Operations Center (SR ROC) and posted on social media. WFO Norman used all available radar data and

> other information to draw potential damage paths. The local application allowed the meteorologists to select points, scan-by-scan, to identify where a tornado was located. This process includes forecaster interpretation in the analysis loop and is different and separate from the rotation tracks products available from the National Severe Storms Laboratory (NSSL). The Federal Emergency Management Agency (FEMA) Director noted these products are "extremely valuable" when integrated into FEMA's GIS applications. These preliminary tracks allowed FEMA to identify the impacted areas and determine resources that might be needed for the recovery as much as 3–4 hours before resources were requested . . .
>
> These GIS products saved FEMA 3–4 hours of response time and helped FEMA staff determine the need for additional urban search and rescue teams before local EMs formally requested this assistance.

Service Assessment: May 2013 Oklahoma Tornadoes and Flash Flooding, pp. 8–9 (NWS, January 2014).

Regional IT teams cannot maintain from a distance the unique software applications and models previously designed by each office's ITOs and with which they are unfamiliar; and termination of the ITOs will eliminate the ability to design and build software applications and forecasting models customized to each office's unique climate and user needs.

In its fiscal year 2016 budget justification, the NWS promises that it will reduce ITO staffing through attrition, but that is not possible if funding for the ITOs is abruptly terminated at the beginning of the upcoming fiscal year. The NWS incorrectly claims that many of the ITOs can qualify for other NWS positions, such as a meteorologist. Although about one-half of the ITOs were meteorologists before being selected as ITOs, it is unlikely that they would qualify to return to the meteorologist jobs series because the educational qualification standards for meteorologists changed in 1998. Only those current meteorologists who were hired before that date and who have been continuously employed in the meteorologist job series are grandfathered under the prior qualification standards. (See NOAA Human Resources Guidance Bulletin #FY14–004 (October 23, 2014).

NWSEO also opposes NOAA's proposal to reduce $1.5 million in funding for development and implementation of the next generation of the Advanced Weather Interactive Processing System. As noted in the agency's Budget Justification, at 73, the "NWS will be limited in providing future tools and capabilities which meteorologists/hydrologists use in situational awareness for warning/forecast preparation" as a result of this reduction, and "[t]he development of robust, efficient service backup capabilities to support local needs as well as COOP activities will also be deferred."

The most troubling impact of this reduction will be the deferral of an updated AWIPS "Weather Event Simulator" or "WES." WES is a training simulator that allows forecasters to replay severe weather events from archived data as case studies as if they were occurring in real-time. Funding for training at the National Weather Service has already fallen to just one-half of 1 percent of the agency's budget.

PREPARED STATEMENT OF THE NATURE CONSERVANCY

Thank you for the opportunity to comment on the fiscal year 2016 appropriations for the National Oceanic and Atmospheric Administration (NOAA). The Nature Conservancy is a non-profit conservation organization working around the world to protect ecologically important lands and waters for both people and nature. As the Nation enters the fiscal year 2016 budget cycle and another year of fiscal challenges, The Nature Conservancy recognizes the need for fiscal restraint and reiterates our concern that natural resource stewardship programs should not bear a disproportionate share of cuts in this budget. We believe the budget levels The Nature Conservancy supports represent a prudent investment in our country's future. It is an investment that not only helps NOAA achieve its most critical missions by catalyzing local and regional action, but also reduces risk and saves money based on tangible economic and societal benefits that natural resources provide.

NATIONAL MARINE FISHERIES SERVICE

Fisheries and Ecosystem Science Programs and Services.—The Nature Conservancy supports the President's request of $146.317 million.

There is a high correlation between the good information about the status of a fish stock and the effectiveness of management. Systems for collecting fishery data tend to be paper-based, slow, expensive and prone to errors and gaps. On-board

video monitoring has been piloted but has yet to be implemented in any U.S. fisheries and the administration's proposed $5.596 million increase for Electronic Monitoring and Reporting will help move these efforts beyond pilots to implementation through funding purchase and maintenance of hardware and software and processing of collected data. Priority should be given to those fisheries across the country that have already piloted these efforts. Also key is improving our understanding of the ecological and economic connections between fisheries and nearshore habitats. The administration's proposed $5 million increase for Ecosystem-based Solutions for Fisheries Management will improve our understanding of the value of ecosystem services and develop the models and tools to incorporate this information into habitat restoration plans and fisheries management actions.

Fisheries Management Programs and Services.—The Nature Conservancy supports the President's request of $128.367 million.

NOAA Fisheries has made important strides in addressing these challenges and strengthening fisheries management; however, much more needs to be done. To recover fish stocks so that they provide food and jobs to struggling fishermen now and in the future, we need to reduce destructive fishing practices, restore coastal habitats that produce fish, and support the efforts of fishermen and fishing communities and do so in a collaborative way. The Conservancy supports the President's request of $128.367 million and highlights two important program increases. The proposed increase of $1.45 million within this line will be used to develop and implement clear procedures and guidance for the use of electronic monitoring. This will include review of pilot project information, regional implementation plans, and coordination with stakeholders. Catch shares give participating fishermen a stake in the benefits of a well-managed fishery and align the incentives for resource stewardship with the natural incentive for fishermen to increase their earnings with a sustainable business model. Transition to these systems is difficult and the modest $2.216 million proposed increase will help NOAA get the design and implementation of these new catch share programs right by engaging fishing communities.

Habitat Management and Restoration.—The Nature Conservancy supports the President's request of $57.885 million.

Coastal wetlands and nearshore waters produce the fish and shellfish that feed America. The health of these places is essential to the economic and social well-being of those who live, work, and recreate in coastal communities. Additionally the restoration and protection of coastal resources help to provide flood control and prevent erosion to protect our communities from storm surges. Through the Community-based Restoration Program and the Habitat Blueprint initiative, The Nature Conservancy works closely with NOAA to restore the health of degraded habitats in places and ways that benefit not just local marine life, but communities and coastal economies as well. Project funds are awarded on a competitive basis and typically leverage the resources and capacity of multiple partners. This work enhances our understanding of the connections between fisheries productivity and habitat, measures the effectiveness of conservation and restoration activities, and applies those lessons to improve future efforts. The administration has also requested an important $3.5 million increase to enhance NOAA's capacity to for consultations on and implementation of Essential Fish Habitat. The Regional Fishery Management Councils address fishing impacts on these areas, and NOAA must have sufficient capacity to provide technical assistance to the Councils and to work with Federal agencies to avoid, minimize, and mitigate the impacts of their actions on these important fishery habitats.

Pacific Coastal Salmon Recovery Fund.—The Nature Conservancy supports maintaining the fiscal year 2015 level of funding of $65 million, $7 million above the President's requested amount.

The Pacific Coast Salmon Recovery Fund (PCSRF) is the most critical Federal program addressing major threats to Pacific salmon so that these fish can continue to sustain culture, economies, recreation, and ecosystem health. PCSRF funding is tailored for each State, competitively awarded based on merit, and has funded hundreds of successful, on-the-ground salmon conservation efforts. PCSRF invests in cooperative efforts to conserve species under NOAA's jurisdiction, and projects are matched at a 3:1 ratio (Federal/non-Federal). Notably, the PCSRF has catalyzed thousands of partnerships among Federal, State, local, and tribal governments, and conservation, business, and community organizations. The Nature Conservancy urges sustaining the fiscal year 2015 enacted level of $65 million.

Fisheries Data Collections, Surveys and Assessments.—The Nature Conservancy supports the President's request of $163.251 million.

Limited or poor quality information on the status of fishery stocks undermines the effectiveness of fishery management and can erode political support for conservation measures. Accurate and timely stock assessments are essential for the sound management of fisheries and the sustainability of fishing resources. The $2.815 million proposed increase to Expand Annual Stock Assessments will help the agency prioritize assessments, determine what level of assessments are needed and, where to appropriately incorporate ecosystem linkages—such as climate, habitat, multispecies, socioeconomic factors.

Marine Mammals, Sea Turtles, and Other Species.—The Nature Conservancy supports the President's request of $145.71 million.

Through this budget line, NOAA awards competitive grants to States and tribes to support conservation actions that contribute to recovery, or have direct conservation benefits for, listed species, recently de-listed species, and candidate species that reside within that State. NOAA's proposed $17 million increase for Species Recovery Grants, including $3.2 million for the 20 newly-listed coral species, will allow the agency to expand partnerships to address the growing number of listed species and allow for larger, ecosystem-level scale recovery efforts The Nature Conservancy works with State agency partners to restore endangered species and monitor the results of these efforts. These grants are essential for having a direct benefit to "on the water" restoration efforts. Additional listed species and emerging challenges to recovery has increased the number and complexity of NOAA's consultation and permitting requirements under the Endangered Species Act and Marine Mammal Protection Act. The proposed $13.23 million to Increase Consultation Capacity will aid NOAA's ability to complete these requirements in a timely manner.

ESA Salmon.—The Nature Conservancy supports the President's request of $68.501 million.

Recovery of listed Atlantic and Pacific salmon provide distinct challenges. NOAA's cooperative efforts with States, tribes, and other partners such as The Nature Conservancy help to improve our understanding of and ability to protect listed salmon and the habitats that sustain them. The $1.301 million proposed increase to base funding will support the design and implementation of fish passage projects critical to the recovery of Atlantic salmon.

NATIONAL OCEAN SERVICE

Coastal Management Grants.—The Nature Conservancy supports the President's request of $116.146 million.

Our Nation's coastal areas are vital to our economy and our way of life. The narrow area along our coasts is home to approximately 163 million people and coastal economies contribute over 45 percent of our gross domestic product. This concentration of activity exposes communities and businesses to risk from coastal storms, changing ocean and economic conditions, and user conflicts. The $45 million proposed increase in competitively awarded Regional Coastal Resilience Grants will provide the resources and tools to build coastal resilience to avoid costly Federal disaster assistance and sustain healthy fisheries, maintain robust tourism opportunities, provide for increased shipping demands, and other coastal industries. The Nature Conservancy has worked with NOAA through the Digital Coast partnership to develop decision support tools and techniques that help communities understand and reduce risk and build resilience. Sharing data across Federal, State, and tribal agencies, industry, and with non-governmental organizations has increased our collective ability to understand and incorporate into decisionmaking complex coastal economic, social, and ecological needs. Through the restoration of coastal habitats and use of natural infrastructure, we can improve communities' ability to minimize storm damage and improve fisheries productivity, water quality, and recreational opportunities.

Coral Reef Program.—The Nature Conservancy supports no less than the President's request of $26.1 million.

The decline of coral reefs has significant social, economic, and ecological impacts on people and communities in the United States and around the world. The Conservancy works with NOAA's Coral Reef Conservation Program under a competitively awarded, multi-year cooperative agreement to address the top threats to coral reef ecosystems: climate change, overfishing, and land-based sources of pollution. Together we develop place-based strategies, measure the effectiveness of management efforts, and build capacity among reef managers globally.

Coastal Zone Management and Services.—The Nature Conservancy supports the President's request of $54.144 million.

NOAA's data, research, and monitoring of coastal and marine systems provide data and decision-support tools that inform the safe operations of industry, prioritize habitats for restoration, and advance science-based management decisions. The administration has requested a $5 million increase for Ecosystem-based Solutions for Coastal Resilience. Improving our ability to incorporate natural infrastructure into coastal protection efforts before and after storms can help communities achieve multiple benefits such as improving fisheries productivity and coastal water quality. The proposed $4.78 million increase for Capacity to Respond to Extreme Events will improve modeling and observations and increased technical assistance to coastal communities to help reduce their risk to coastal storms and extreme weather, ultimately saving Federal disaster response and recovery expenditures. This will be further leverage by the proposed $2 million increase for the AmeriCorps' Resilience Corps Pilot Program Training and Technical Assistance. Decision support tools and increasing capacity within communities are cost-effective mechanisms to enable the implementation of resilience strategies.

National Estuarine Research Reserve System.—The Nature Conservancy supports no less than the President's request of $21.3 million.

The National Estuarine Research Reserve System (NERRS) partners with States and territories to ensure long-term education, stewardship, and research on estuarine habitats. Atlantic, Gulf, Pacific, Caribbean and Great Lakes reserves advance knowledge and stewardship of estuaries and serve as a scientific foundation for coastal management decisions.

Sanctuaries and Marine Protected Areas.—The Nature Conservancy supports no less than the President's request of $48.3 million.

National marine sanctuaries support economic growth and hundreds of coastal businesses in sanctuary communities, preserve vibrant underwater and maritime treasures for Americans to enjoy, and provide critical public access for ocean recreation, research, and education. Investment in these sites does more than simply protect discrete areas of the ocean; it places a down payment for the many Americans whose livelihoods are dependent on a healthy ocean and coasts.

Thank you for this opportunity to share The Nature Conservancy's priorities. We would be pleased to provide the subcommittee with additional information on any of the Conservancy's activities.

PREPARED STATEMENT OF THE NORTHWEST INDIAN FISHERIES COMMISSION

Mr. Chairman and members of the subcommittee, my name is Lorraine Loomis and I am the Chairwoman of the Northwest Indian Fisheries Commission (NWIFC). The NWIFC is comprised of the 20 tribes that are party to the *United States v. Washington* [1] *(U.S. v. Washington).* We are providing testimony for the record in support of funding for the National Oceanic and Atmospheric Administration (NOAA)/National Marine Fisheries Service (NMFS) for the fiscal year 2016 appropriations.

SUMMARY OF FISCAL YEAR 2016 APPROPRIATIONS REQUESTS

—$110.0 million for the Pacific Coastal Salmon Recovery Fund (NOAA/NMFS).
—$13.8 million for the Pacific Salmon Treaty, including the additional $3.0 million for the 2008 Chinook Salmon Agreement (NOAA/NMFS).
—$18.9 million for the Mitchell Act Hatchery Program (NOAA/NMFS).

We are generally pleased with the President's fiscal year 2016 budget request but much more needs to be done. It promotes a strong stewardship in sustaining our vital natural resources. The natural resources that we depend on are vital to our tribal communities, economies and jobs. The land and the many natural resources we depend on are a necessity for our communities to thrive.

The western Washington treaty tribes brought to the Federal Government our Treaty Rights at Risk (TRAR) initiative almost 4 years ago. The continued loss and degradation of the salmon habitat continues to hamper our salmon recovery efforts, which threatens our tribal treaty rights. The Federal Government has the obligation and authority to ensure both the recovery of salmon and the protection of tribal

[1] *United States v. Washington,* Boldt Decision (1974) reaffirmed Western Washington Tribes' treaty fishing rights.

treaty rights. These constitutionally protected treaties, the Federal trust responsibility and extensive case law, including the *U.S. v. Washington* decision, all support the role of tribes as natural resource managers, both on and off reservation. While our TRAR has garnered a lot of discussion, it has been slow to create any change in the manner in which Federal agencies operate. It has not been enough to change the trajectory of salmon recovery in our region from a negative to a positive direction.

Salmon has always been the foundation of tribal cultures, traditions and economies in western Washington. Wild salmon and their habitat continue to decline despite massive reductions in harvest and a significant investment in salmon recovery and habitat restoration. However, fulfilling these Federal obligations is not an option and these investments must continue as we work to recover the salmon populations.

In Washington State, we have developed a successful co-management partnership between the Federal, State and tribal governments. Tribes seize every opportunity to coordinate with other governments and non-governmental entities to avoid duplication, maximize positive impacts, and emphasize the application of ecosystem-based management. This collaboration has helped us to deal with many problems, and as sovereign nations, we will continue to participate in resource recovery and habitat restoration with the State of Washington and the Federal Government because we understand the great value of such cooperation.

Hatchery production also continues to be a critical component in fulfilling these treaty-reserved rights and play a vital role in the management of our fisheries. In addition to our habitat concerns, the hatchery systems in the State of Washington are under attack by third party litigation due to the lack of approved Hatchery and Genetic Management Plans (HGMPs) under the ESA. This was realized last fall with legal action that prevented the release of one million hatchery steelhead in western Washington. The problem will continue until the National Marine Fisheries Service has completed its ESA determinations. Resources and immediate action is needed to address the current backlog of HGMPs so that Indian and non-Indian fishermen and our communities are not further impacted by loss of their fisheries.

To address these many concerns adequate funding is necessary for hatchery production and salmon habitat restoration. The programs we support provide the necessary salmon production and assists tribes in the implementation of salmon recovery plans that moves us in the direction of achieving the recovery goals, which is a direct request in our TRAR initiative. As Congress considers the fiscal year 2016 budget, we ask you to consider our requests that are further described below.

JUSTIFICATION OF REQUESTS

Provide $110.0 million for NOAA Pacific Coastal Salmon Recovery Fund

We respectfully request $110.0 million, an increase of $52.0 million over the President's request. The fiscal year 2015 appropriations provided a total of $65.0 million. These funds have decreased from the peak of $110.0 million in fiscal year 2002. We continue to support the original congressional intent of these funds that would enable the Federal Government to fulfill its obligations to salmon recovery and the treaty fishing rights of the tribes.

The PCSRF is a multi-State, multi-tribe program established by Congress in fiscal year 2000 with a primary goal to help recover wild salmon throughout the Pacific coast region. The PCSRF supports projects that restore, conserve and protect Pacific salmon and steelhead and their habitats. PCSRF is making a significant contribution to the recovery of wild salmon throughout the region by financially supporting and leveraging local and regional efforts. Salmon restoration projects not only benefits fish populations and their habitat but provides much needed jobs for the local communities.

The tribes' overall goal in the PCSRF program is to restore wild salmon populations while the key objective is to protect and restore important habitat in Puget Sound and along the Washington coast. This is essential for western Washington tribes to exercise their treaty-reserved fishing rights consistent with *U.S. v. Washington* and *Hoh v. Baldrige*[2] and also promotes the recovery of ESA listed species and other salmon populations. The tribes have used these funds to support the scientific salmon recovery approach that makes this program so unique and important.

It is for these reasons that the tribes strongly support the PCSRF. We will continue to seek an equitable allocation to the NWIFC and member tribes through the NOAA Fisheries funding process. These funds support policy and technical capac-

[2] *Hoh v. Baldrige*—A Federal court ruling that required fisheries management on a river-by-river basis.

ities within tribal resources management to plan, implement, and monitor recovery activities. In addition to watershed restoration and salmon recovery work they also help fund fish hatchery reform efforts to allow for the exercise of tribal treaty fishing rights.

Provide $13.8 million for NOAA Pacific Salmon Treaty, including the additional $3.0 million associated with the 2008 Chinook Salmon Agreement

We support the Pacific Salmon Commission (PSC)/U.S. Section's request of $13.8 million, an increase of $2.5 million over the President's request. The fiscal year 2015 appropriations provided a total of $11.3 million. We also support as part of their request $1.5 million for the Puget Sound Critical Stock Augmentation Program and $1.5 million for the Coded Wire Tag (CWT) Program as required by the 2008 PST Chinook Annex Agreement.

The Puget Sound Critical Stock funding covers the operation and maintenance costs for the hatchery augmentation programs established for Dungeness, Stillaguamish, and Nooksack Chinook. These hatchery efforts were initiated in connection with the 2008 Chinook Agreement of the US/Canada Pacific Salmon Treaty (PST) as the conservation needs of these populations could not be met by harvest restriction actions alone. The CWT funding allows for continued maintenance and efficiency improvements of the coast-wide CWT program. This is essential for the sustainability and management of our fisheries resources. Currently there is not enough funding allocated to carry out the requirements of the PST, which causes the PSC to not be able to perform all of its responsibilities required in the treaty and its Chinook and coho annexes. As co-managers of the fishery resources in western Washington, tribal participation in implementing the PST is critical to achieve the goals of the treaty to protect, share and restore salmon resources.

The PST was implemented in 1985 through the cooperative efforts of tribal, State, U.S. and Canadian Governments, and sport and commercial fishing interests. The PSC was created by the United States and Canada to implement the treaty, which was most recently updated in 2008. The PSC establishes fishery regimes, develops management recommendations, assesses each country's performance and compliance with the treaty, and is the forum for all entities to work towards reaching an agreement on mutual fisheries issues. As co-managers of the fishery resources in western Washington, tribal participation in implementing the PST is critical to achieve the goals of the treaty to protect, share and restore salmon resources.

Adult salmon returning to most western Washington streams migrate through U.S. and Canadian waters and are harvested by fisherman from both countries. For years, there were no restrictions on the interception of returning salmon by fishermen of neighboring countries. The 2008 update of the treaty gave additional protection to weak runs of Chinook salmon returning to Puget Sound rivers. The update also provided compensation to Alaskan fishermen for lost fishing opportunities, while also funding habitat restoration in the Puget Sound region.

Provide $18.9 million for NOAA Mitchell Act Hatchery Program

We respectfully request $18.9 million for the Mitchell Act Hatchery Program, an increase of $3.0 million over the President's request. The fiscal year 2015 appropriations provided a total of $18.9 million. Funding is provided for the operation of 17 fish hatcheries that release between 50 and 60 million juvenile salmon and steelhead in Oregon, Washington, and Idaho. This program has historically provided fish production for tribal treaty fisheries in the Columbia River, and for ocean and in-river recreational and commercial fisheries.

It is especially important to us in that they provide significant fish production for harvest opportunities for tribal treaty fisheries along the Washington coast. Providing adequate funding to maintain the current production levels from the Mitchell Act hatcheries on the Columbia River is important as this production not only supports coastal salmon fisheries but dampens the impact of Canadian fisheries under the terms of the PST Chinook Annex on Puget Sound and coastal stocks.

Overall production from these hatcheries has been reduced from more than 100 million to fewer than 60 million fish. This hatchery production is intended to mitigate for the lost production caused by the hydropower dam system on the Columbia River. Substantial changes have been made, and will continue to be required of the Mitchell Act Program, due to the application of the ESA throughout the Columbia Basin. Adequate funding will also allow these facilities to be retrofitted to meet current ESA standards as identified through the hatchery reform process.

CONCLUSION

The treaties and the treaty-reserved right to harvest are the supreme law of the land under the U.S. Constitution. Some of the treaty tribes have had to give up even

their most basic ceremonial and subsistence fisheries, which is unacceptable. It is critically important for Congress and the Federal Government to do even more to coordinate their efforts with State and tribal governments. We need your continued support in upholding the treaty obligations and fulfilling the trust responsibility of those treaties in order for tribes to be successful.

We respectfully urge you to continue to support our efforts to protect and restore our great natural heritage that in turn will provide for thriving economies. Thank you.

PREPARED STATEMENT OF OCEAN CONSERVANCY

Thank you for this opportunity to provide Ocean Conservancy's recommendations for fiscal year 2016 funding for NOAA. Ocean Conservancy has worked for over 40 years to address ocean threats through sound, practical policies that protect our ocean and improve our lives. We support funding for NOAA at or above the President's request of $6 billion, and we support balanced investments across NOAA's atmospheric and oceanic missions. We recommend the following funding levels for specific programs.

Account, Program or Activity	Fiscal year 2015 enacted	Fiscal year 2016 President's budget request	Fiscal year 2016 Ocean Conservancy request
OPERATIONS RESEARCH AND FACILITIES			
National Ocean Service:			
Navigation, Observations, and Positioning	$189.206 million	$195.5 million	$195.5 million
Coastal Science, Assessment, Response, and Restoration:			
Marine Debris	—	—	$8 million
Arctic Spill Preparedness	—	$1.3 million increase	$1.3 million increase
National Marine Fisheries Service:			
Marine Mammals, Sea Turtles, and Other Species.	$115.219 million	$145.71 million	$147.61 million
Fisheries and Ecosystem Science Programs and Services.	$132.189 million	$146.317 million	$146.317 million
Electronic Monitoring and Reporting	—	$5.596 million increase	$5.596 million increase
Distributed Biological Obs. (Arctic)	—	$879,000 increase	$879,000 increase
Fisheries Data Collections, Surveys and Assessments.	$158.271 million	$163.251 million	$163.251 million
Fisheries Management Programs and Services.	$120.458 million	$128.367 million	$128.367 million
Management and Reg. Support for Electronic Technologies.	—	$1.45 million increase	$1.45 million increase
Office of Oceanic and Atmospheric Research:			
Integrated Ocean Acidification	$8.5 million	$30.005 million	$30.005 million
Regional Climate Data and Information	$38 million	$52.437 million	$52.437 million
NOAA Arctic Research Program	—	$2.190 million increase	$2.190 million increase
Program Support:			
Marine Operations and Maintenance	$175 million	$178.838 million	$178.838 million

PREPARING FOR A CHANGING ARCTIC

We support the three funding increases requested by NOAA in fiscal year 2016 that make investments we need now to be prepared for economic and ecological challenges of a changing Arctic. We also support continued funding for oceanographic charting of Arctic waters. Ocean Conservancy supported NOAA's requested increases last fiscal year as well, but the funding was not appropriated. Considering the U.S. chairmanship of the Arctic Council beginning this calendar year, it is even more important now that these investments be made to demonstrate U.S. leadership in the Arctic.

—*Navigation, Observations and Position: $195.5 million*

The Coast Guard's recently announced continuation and expansion of its Port Access Route Study in the Chukchi Sea, Bering Strait, and Bering Sea points to the importance of up-to-date Arctic charts. In addition, NOAA's Arctic Vision and Strategy notes that confidence in the nautical charts of the Arctic region is "extremely low." NOAA has made progress in recent years with new or updated charts for Kotzebue Harbor, Bering Strait North, and DeLong Mountain

Terminal, but Arctic waters are vast and it will take steady and consistent effort to complete the work of modernizing Arctic nautical charts.

—*Arctic Spill Preparedness: $1.3 million increase*

Currently, there is no demonstrated technology, technique or infrastructure to respond effectively to an oil spill in icy Arctic waters. Funding to support improved models, increased capacity and coordination, and research is urgently needed. Along with a precautionary approach, these efforts can guide decisions about whether development activities should occur in the Arctic and, if so, when, where, and how they occur.

—*Distributed Biological Observatory (Arctic): $879,000 increase*

The Arctic marine ecosystem provides irreplaceable benefits, but our understanding of this ecosystem is hampered by a lack of reliable baseline data, critical science gaps, and limited documentation and application/use of traditional knowledge. Funding will provide much-needed support for collection of baseline data and analysis of ecosystem functions in Arctic marine waters so we better understand Arctic fisheries and other valuable ecosystem services. Without this better understanding our ability to make informed decisions is compromised.

—*NOAA Arctic Research Program: $2.19 million increase*

Temperatures in the Arctic are warming at twice the rate of the global average and seasonal sea ice is diminishing rapidly. Funding to expand and improve NOAA's Arctic Observing Network is critical to track and understand these profound changes and provide products that inform industries and decision–makers and support our ability to adapt.

MARINE DEBRIS: $8 MILLION

Marine debris has become one of the most pervasive pollution problems facing the world's oceans, coasts and waterways. Research has demonstrated that persistent debris has serious effects on the marine environment, wildlife and the economy. Marine debris causes wildlife entanglement, ghost fishing, destruction of habitat, navigational hazards, vessel damage and pollutes coastal areas. There is also increasing concern over the threat of microplastics to the marine food web and potentially humans. NOAA's Marine Debris program supports existing monitoring and research efforts to better understand accumulation rates of debris and debris source and sink dynamics. The program catalyzes scientific research efforts to quantify the direct and indirect economic impacts caused by marine debris on coastal communities and economies that rely on them. NOAA is instrumental in the removal of hundreds of tons of marine debris from our coasts and waters every year, restoring the productivity of coastal and marine ecosystems. And increasingly, NOAA's program is emphasizing research on microplastics in the ocean and their toxicological impacts on marine organisms. NOAA's Marine Debris program was originally authorized at a level of $10 million. We support funding for this program at $8 million.

MARINE MAMMALS

We do not support NOAA's proposed cut of $1.9 million dollars from the John H. Prescott Marine Mammal Rescue Assistance Grant Program. This cut would harm marine mammal stranding networks, which are the first responders for sick or dying marine mammals. Marine mammals face significant threats in the Gulf of Mexico, from oil and gas exposure with the Galveston Bay Spill providing the latest example, to the ongoing unusual mortality event (UME) occurring in the northern Gulf. Since February 2010, over 1300 marine mammals have died in the Northern Gulf of Mexico which is both three times more animals impacted and three times longer in duration than any other UME in the Gulf. Programs in Texas and Florida in particular would be harmed by this cut because they are not currently benefitting from BP Natural Resource Damage Assessment dollars that are temporarily filling funding gaps in northern Gulf rescue centers, but not elsewhere.

FISHERIES SCIENCE AND MANAGEMENT

We support funding for programs that implement the *Magnuson-Stevens Fishery Conservation and Management Act.* As we review the Act for reauthorization, it is important to note that the Act is working—NOAA has made great strides towards ending overfishing and continued investments in these programs are needed.

—*Electronic Monitoring and Reporting: $5.596 million increase in Fisheries and Ecosystem Science Programs and Services; $1.45 million increase in Fisheries Management Programs and Services*

We support increasing funding for electronic monitoring and reporting requested by NOAA. This funding has been requested for nationwide efforts, but in the Gulf of Mexico alone, where managers need electronic monitoring to keep track of catch and prevent overruns in the red snapper fishery, there is significant need for additional funding. Based on the findings of the November 2014 "Technical Subcommittee Report to the South Atlantic and Gulf of Mexico Fishery Management Councils: Recommendations for Electronic Logbook Reporting" NOAA's requested increases are only a portion of what is needed to support effective electronic monitoring. The Gulf of Mexico region alone will require more than $5 million annually to support electronic monitoring.

—*Expand Annual Stock Assessments: $2.815 million increase in Fisheries Data Collections, Surveys and Assessments*

This funding provides critically needed resources for fisheries managers to assess priority fish stocks, implement the requirement for annual catch limits (ACLs), and ensure the successful recovery of overfished populations. These activities give fishery managers greater confidence that their ACLs will avoid overfishing while providing optimal fishing opportunities. Because the information provided by stock assessments is so vital for sustainable management of U.S. fisheries, increased funding for stock assessments should remain among the highest priorities in fiscal year 2016.

—*Marine Recreational Information Program*

We also support full funding for Fisheries Data Collections, Surveys and Assessments because this funding supports the Marine Recreational Information Program. Despite their often sizeable economic and biological impacts, much less data are collected from recreational saltwater fisheries than commercial fisheries due to the sheer number of participants and limited sampling of anglers' catches. The low level of data collection and lack of timely reporting of data in these fisheries is a large source of uncertainty and has become a flashpoint for controversy in regions where catch restrictions have been adopted to rebuild overfished stocks, particularly in the Southeast. By all accounts, improved sampling and timelier reporting of catch data are needed for successful management of marine recreational fisheries.

—*Marine Operations and Maintenance: $178.838 million*

Marine Operations and Maintenance should be funded at or above the President's request level of $178.838 million. Days at sea funded by this line are functionally tied to fishery stock assessments, and the two programs must be viewed together.

INTEGRATED OCEAN ACIDIFICATION

In recent years, scientists have raised the alarm about ocean acidification—a process whereby ocean waters' absorption of carbon dioxide emissions alters marine acidity. These changes can have far-reaching consequences for marine life, including economically important species like shellfish. For example, the shellfish industry in the Pacific Northwest has been devastated in recent years as increasingly acidic water impacted oyster hatcheries, nearly wiping out several years-worth of oyster "seed."

Given the magnitude of the potential impacts of ocean acidification we believe this area warrants the increased research investment proposed in the President's fiscal year 2016 request of $30.005 million. We greatly appreciate last year's appropriation of $8.5 million for fiscal year 2015, and believe the increase in funding is critical to allow NOAA to not only keep existing programs running, and continue assessing acidification effects on commercial and recreational marine species, but also improve and expand existing regional shared ocean acidification experimental facilities, and develop synthesis and visualization products responsive to stakeholder needs. By increasing the programmatic funding for Integrated Ocean Acidification, NOAA will be able to take these concrete actions to more effectively tackle the economic and local implications of ocean acidification and prepare for future strategies that will protect our Nation's key ocean and coastal economies.

PREPARED STATEMENT OF THE POPULATION ASSOCIATION OF AMERICA/ASSOCIATION OF POPULATION CENTERS

Thank you, Chairman Shelby, Ranking Member Mikulski, and other distinguished members of the subcommittee, for this opportunity to express support for the Census Bureau, the National Science Foundation (NSF), and the Bureau of Economic

Analysis (BEA). These agencies are important to the Population Association of America (PAA) and Association of Population Centers (APC), because they provide direct and indirect support to population scientists and the field of population, or demographic, research overall. In fiscal year 2016, we urge the subcommittee to adopt the following funding recommendations: Census Bureau, $1.5 billion, consistent with the administration's request; National Science Foundation (NSF), $7.7 billion, consistent with the administration's request; and, Bureau of Economic Analysis, $110 million, consistent with the administration's request.

The PAA and APC are two affiliated organizations that together represent over 3,000 social and behavioral scientists and almost 40 population research centers nationwide that conduct research on the implications of population change. Our members, which include demographers, economists, sociologists, and statisticians, conduct scientific research, analyze changing demographic and socio-economic trends, develop policy recommendations, and train undergraduate and graduate students. Their research expertise covers a wide range of issues, including adolescent health and development, aging, health disparities, immigration and migration, marriage and divorce, education, social networks, housing, retirement, and labor. Population scientists compete for funding from the NSF and rely on data produced by the Nation's statistical agencies, including the Census Bureau and BEA, to conduct research and research training activities.

THE CENSUS BUREAU

The Census Bureau is the premier source of data regarding U.S. demographic, socio-economic, and housing characteristics. While PAA/APC members have diverse research expertise, they share a common need for access to accurate, timely data about the Nation's changing socio-economic and demographic characteristics that only the U.S. Census Bureau can provide through its conduct of the decennial census, American Community Survey (ACS), and a variety of other surveys and programs.

We recognize that the fiscal year 2016 request is $413 million more than the agency's fiscal year 2015 funding level. However, as you know, the Census Bureau's budget is cyclical, and fiscal year 2016 is a pivotal year in the 2020 Census planning cycle. This fall, after completing several years of in-depth research and testing, the Census Bureau will announce the design framework for the 2020 Census. The design decision is already a year behind schedule, due to past budget shortfalls, and the agency must pivot immediately to the systems and operations development phase of the census, as it prepares to execute that design. In fiscal year 2016, the agency plans to:

—conduct a Field Operations Test to evaluate new 2020 Census management framework for nonresponse follow-up operations;
—perform the 2016 Early Operations Test of new, targeted address canvassing methods;
—evaluate the use of administrative records to remove inaccurate addresses and to enumerate households that do not self-respond;
—initiate the 2020 Census Communications campaign;
—hire hundreds of new employees to manage and implement design and development activities and to conduct field tests; and
—implement a national content test for the ACS to reduce the survey's response burden, improve the usefulness of data products, and streamline field operations.

These ambitious plans, if supported, would not only enhance the conduct and outcome of the 2020 Census, but could also make it more cost effective, saving an estimated $5 billion over the lifecycle cost of the census. Conversely, without sufficient resources to pursue these innovations, the bureau is likely to rely on traditional and far more costly census methods— an outcome that would jeopardize the accuracy of the 2020 Census and most certainly preclude the agency from abiding by Congress' directive to keep the cost of the next census at the 2010 level.

With respect to the ACS, the PAA and APC urge the subcommittee to oppose any attempts that may occur during consideration of the fiscal year 2016 Commerce, Justice, Science appropriations bill to change the mandatory response status of the ACS. In 2003, the Census Bureau conducted a test on a voluntary ACS. They found that survey costs increased by approximately $60 million ($90 in real dollars) and response rates decreased by an estimated 20 percent. Canada's recent experience of moving from a mandatory to voluntary long form is a cautionary example. The overall response rate dropped from 94 percent to under 69 percent, increasing costs by $22 million as Statistics Canada increased the sample size to make up for lower response. Despite these efforts, Statistics Canada could not produce reliable socio-eco-

nomic estimates for 25 percent of all "places" in the Nation—mostly small communities and rural areas. Experts have described the data on income as not usable for business and policy purposes. The U.S. should heed Canada's example and maintain the integrity of the mandatory ACS.

NATIONAL SCIENCE FOUNDATION (NSF)

The mission of NSF is to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense. Understanding the implications of complex population dynamics is vital to the agency's mission. The Directorate of Social, Behavioral and Economic (SBE) Sciences is the primary source of support for the population sciences within the NSF. The Directorate funds critical large-scale longitudinal surveys, such as the Panel Study of Income Dynamics, that inform pressing policy decisions and enable policy makers to make effective decisions. Other projects, such as the Social Observatory Coordinating Network, integrate social science and health research, linking community and national data to improve population health.

NSF is the funding source for over 20 percent of all federally supported basic research conducted by America's colleges and universities, including basic behavioral and social research. SBE funds more than half of the university-based social and behavioral sciences research in the Nation.

PAA and APC, as members of the Coalition for National Science Funding, request that the subcommittee provide the NSF with the administration's request, $7.7 billion. This budget will enable the NSF SBE Directorate to continue its support of social science surveys and a robust portfolio of population research projects. The NSF also continues to focus on interdisciplinary research initiatives, recognizing that social and behavioral factors are intrinsic to many critical areas of research—for example the recent Understanding the Brain initiative. Funding at this level will enable NSF to maintain funding for the most promising grant applications that promote transformational and multidisciplinary research. Steady and sustainable real growth will enhance the Nation's capability to make new discoveries, leading to new innovations.

BUREAU OF ECONOMIC ANALYSIS (BEA)

While a relatively small agency, the BEA is enormously important to understanding our multi-trillion dollar economy. A diverse range of data users rely on BEA data: Federal, State and local government officials use BEA data to inform economic and fiscal policy; businesses use BEA data to guide investment decisions; and scientists use BEA data to understand and interpret trends in labor, employment, and national and international economies. Despite its importance, since fiscal year 2010, the BEA budget has not kept pace with inflation. The PAA and APC join other national organizations to urge the subcommittee to provide BEA with $110 million in fiscal year 2016. This funding is necessary to both restore the agency's purchasing power and to launch new initiatives to improve energy accounting and economic statistics and to expand data used to inform trade negotiations and support trade promotion efforts.

Thank you for considering our requests and for supporting Federal programs that benefit the population sciences.

PREPARED STATEMENT OF RESTORE AMERICA'S ESTUARIES

Restore America's Estuaries is a nonpartisan, nonprofit organization that has been working since 1995 to restore our Nation's greatest estuaries. Our mission is to restore and protect bays and estuaries as essential resources for our Nation. Restore America's Estuaries is an alliance of community-based coastal conservation organizations across the Nation that protect and restore coastal and estuarine habitat. Our member organizations include: American Littoral Society, Chesapeake Bay Foundation, Coalition to Restore Coastal Louisiana, Save the Sound—a program of the Connecticut Fund for the Environment, Conservation Law Foundation, Galveston Bay Foundation, North Carolina Coastal Federation, EarthCorps, Save The Bay—San Francisco, Save the Bay—Narragansett Bay, and Tampa Bay Watch. Collectively, we have over 250,000 members nationwide.

As you craft your fiscal year 2016 Commerce, Justice, Science and Related Agencies appropriations bill, Restore America's Estuaries encourages you to provide the funding levels below within the Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) for core programs which greatly support coastal community economies:

—$47 million for Habitat Conservation and Restoration ($62.235 million under proposed new structure)
(CJS: NOAA: ORF: NMFS: Habitat Conservation and Restoration)

—$50 million for Regional Resilience Grants
(CJS: NOAA: PAC: NOS: CELCP Acquisition)

—$23.9 million for National Estuarine Research Reserve System
(CJS: NOAA: ORF: NOS: Ocean and Coastal Management and Services: National Estuarine Research Reserve System)

—$1.7 million for National Estuarine Research Reserve Construction
(CJS: NOAA: PAC: NOS: NERRS Construction)

These investments strengthen and revitalize America's communities by buffering against storms, supporting commercial fisheries, preventing erosion, protecting vital infrastructure, eliminating public safety hazards, and providing new recreational opportunities.

NOAA HABITAT CONSERVATION AND RESTORATION

NOAA's Office of Habitat Conservation (OHC) protects, restores, and promotes stewardship of coastal and marine habitat to support our Nation's fisheries and improve the resiliency of coastal communities through financial support and a range of restoration expertise and services. Within funds provided, we ask that the subcommittee provide no less than $26 million for Community-based Restoration, Resiliency Grants, and Estuary Restoration Program.

Funding for the Office of Habitat Conservation through the Habitat Conservation and Restoration PPA supports both the Community-based Restoration Program, Estuary Restoration Program and staff capacity to efficiently execute and facilitate habitat restoration nationwide. Activities range from planning and implementation activities for Natural Resource Damage Assessment (NRDA) and Restoration Trustee responsibilities for all active cases (e.g. Deepwater Horizon oil spill) to expert restoration services across NOAA programs including the Coastal Wetlands Planning Protection and Restoration Act (CWPPRA), the Great Lakes Restoration Initiative (GLRI), and the National Fish Habitat Action Plan and the National Fish Habitat Partnership (NFHP). Focusing NOAA's restoration capacity within the OHC Restoration Center allows NOAA to efficiently execute and facilitate habitat restoration nationwide.

We urge the subcommittee to leverage the existing staff capacity and restoration expertise within the Restoration Center and support efforts to elevate NOAA's Community-based Restoration Program. This program supports locally driven and voluntary coastal restoration projects with national, regional, and local organizations through competitively awarded public-private partnerships. This non-regulatory tool is unique within NOAA because of its ability to provide seed funding for community-driven and innovative restoration. CBRP complements traditional fishery management and leverages non-Federal resources 3–5 times the Federal investment. Projects result in healthier habitats, which strengthen our commercial and recreational fisheries.

Restore America's Estuaries appreciates the subcommittee's past support for the Community-based Restoration Program and the inclusion of report language directing NOAA to ensure restoration funds achieve multiple benefits, including but not limited to fisheries.

The Estuary Restoration Program was transferred from the National Ocean Service to the National Marine Fisheries Service under the Habitat Conservation and Restoration PPA without additional funding in the fiscal year 2014 omnibus appropriations. The Estuary Restoration Act established a comprehensive interagency organization, the Estuary Habitat Restoration Council, which is comprised of five key Federal restoration agencies and leads a coordinated approach to enhance estuary habitat restoration. Under the Act, NOAA is responsible for maintaining the National Estuaries Restoration Inventory (NERI). Modest funding is necessary for maintaining/updating NERI and to ensure cross-agency collaboration continues. Restore America's Estuaries urges your continued support of the Estuary Restoration Council and NOAA's Estuary Restoration Program.

We strongly urge the subcommittee to provide no less than $47 million for Habitat Conservation and Restoration, which maintains the fiscal year 2015 enacted level. Within funds provided, no less than $26 million should be for the Community-based Restoration Program, Resiliency Grants, and Estuary Restoration Program. To adopt the administration's proposed changes to the Habitat Conservation and Res-

toration PPA and maintain level external restoration funding, the subcommittee must provide no less than $62.235 million if the proposed new structure is adopted. Restore America's Estuaries strongly supports the inclusion of the following:

> *Report Language:* Within funds provided, NOAA shall maximize external funding for public-private partnerships. NOAA shall issue a revised call for partnership proposals that prioritize direct community involvement and stewardship of local projects that support a range of benefits to coastal watershed communities. The subcommittee encourages NOAA to prioritize projects with diversity of support, but not to require the support of a coastal State's governor due to the burden this places on smaller organizations.

NOAA, REGIONAL COASTAL RESILIENCE GRANTS

(CJS: NOAA: ORF: NOS: Regional Coastal Resilience Grants)

Restore America's Estuaries commends the administration's request for $50 million for the Regional Coastal Resilience Grant Program to more fully address a suite of resilience challenges facing all U.S. coastal regions—including community, ecosystem, and economic resilience—within a single, competitive grants program. Restore America's Estuaries encourages the subcommittee to look at the Community-based Restoration Program and the NOAA Restoration Center as models for scaling ecosystem restoration efforts that increase resilience. NOAA estimates 2,000 acres of habitat restored per $5 million invested in ecosystem resilience grants.

Previous proposals have included language suggesting that project sponsors secure the support of the coastal State's Governor. We encourage the subcommittee to reconsider the requirement of securing support of the State's Governor due to the difficulty and burden this places on smaller organizations like local nonprofits. Specifically we are concerned this could disadvantage some community-driven projects if they do not have access to the State's Governor, especially in medium to large States.

Restore America's Estuaries urges Congress to fund the Regional Coastal Resilience Grant Program at $50 million. We urge the subcommittee to ensure that NOS coordinates closely with the Restoration Center to increase efficiency and leverage capacity to help meet shared goals.

NOAA, NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM

(CJS: NOAA: ORF: NOS: Ocean and Coastal Management and Services: National Estuarine Research Reserve System)/(CJS: NOAA: PAC: NOS: NERRS Construction)

The National Estuarine Research Reserve System (NERRS) is comprised of 28 protected reserves that support long-term research, education, training, and monitoring. Through an effective partnership between NOAA and coastal States, NERRS plays a critical role in sustaining resilient coasts and coastal communities.

The States have been entrusted to operate and manage NOAA's program in 22 States and Puerto Rico, where over 1.3 million acres of land and water are protected in perpetuity.

Restore America's Estuaries respectfully requests $23.9 million for NERRS operations in fiscal year 2016. At this funding level, the 28 existing reserves will maintain level funding and support will be provided for the addition of the 29th reserve in Hawaii. The designation of a Hawaii NERR will fill an unrepresented bio-geographic region in the NERR system.

NERRS assists our coastal communities, industries and resource managers to enhance coastal resiliency in a changing environment. As severe weather events become more common, Federal, State, and local officials are recognizing that estuaries have the capacity to provide green resilience infrastructure. Through NERRS, NOAA can tailor science and management practices to enable local planners to use estuarine habitat as a tool for resilience and adaptation.

Through scientific research and science-based management of more than 1.3 million acres of protected land, NERRS provides numerous benefits to communities that result in improved water quality, increased upland flood and erosion control, and improved habitat quality that support local fisheries and provide storm protection to coastal communities.

CONCLUSION

Restore America's Estuaries greatly appreciates the support this subcommittee has provided in the past for these important programs. These programs help to accomplish on-the-ground restoration work which results in major benefits:

—*Jobs*.—Coastal habitat restoration projects create between 17–33 jobs per $1 million invested. That's more than twice as many jobs as the oil and gas sector and road construction industries combined.
—*More fish*.—Traditional fisheries management tools alone are inadequate. Fish need healthy and abundant habitat for sustainable commercial and recreational fisheries.
—*Resiliency*.—Restoring coastal wetlands can help knock down storm waves and reduce devastating storm surges before they reach the people and property along the shore.
—*Leverage*.—Community-based restoration projects leverage 3–5 times the Federal investment through private matching funds, amplifying the Federal investment and impact.

Thank you for taking our requests into consideration as you move forward in the fiscal year 2016 appropriations process. We stand ready to work with you and your staff to ensure the health of our Nation's estuaries and coasts.

PREPARED STATEMENT OF THE SEA GRANT ASSOCIATION

On behalf of the 33 Sea Grant programs in every coastal and Great Lake State, plus Puerto Rico and Guam, the Sea Grant Association (SGA) expresses its gratitude to the subcommittee for strong and consistent support it has provided year in and year out for the National Sea Grant College Program (Sea Grant). As the subcommittee works to develop an fiscal year 2016 appropriations bill the SGA urges the subcommittee to take full advantage of the Sea Grant program's strengths in research, extension, outreach, and education—particularly in the area of coastal community resiliency—by fully funding the program at a level of $80 million and rejecting the administration's proposal to terminate STEM education in the Sea Grant program.

Sea Grant is NOAA's Federal-State partnership program that supports science-based, environmentally sustainable practices to ensure our coastal communities remain engines of economic growth in a rapidly changing world. For example, over the next century, sea level rise in the Los Angeles region is expected to match global projections with an increase of 0.1–0.6 meters from 2000 to 2050. California Sea Grant developed and released the first study of what this will mean to one of America's largest cities and spurred creation of a regional planning process to protect the city from the consequences.

Meanwhile Sea Grant researchers in Hawaii are providing improved projections of how ocean acidification is likely to impact Hawaiian coral reefs and examining the potential for corals to adapt or acclimatize to future conditions. Hawaiian coral reefs are valued at over $33 billion annually to the American public, and every year Hawaii derives an estimated $364 million directly from coral reefs in addition to other benefits, such as shoreline protection.

Georgia Sea Grant is working with the Georgia Department of Natural Resources to develop a detailed climate adaptation plan for the barrier island community of Tybee Island, Georgia. The plan, based on specific adaptation scenarios, visualizes impacts from storm surges and coastal flooding. The City of Tybee Island has formally agreed to consider adopting the recommendations developed by this project through appropriate local ordinances, infrastructural improvements, and other municipal actions.

Additionally, when *Hurricane Sandy* hit, large sections of Jersey City, a hospital and City Hall had to be evacuated because of flooding. New Jersey Sea Grant experts put satellite data and imagery to work and engaged with city planners to design a resiliency plan that adapts the area's coastlines to mitigate and prevent similar disasters in future storms.

These are a just a few of the many examples of Sea Grant's work across the Nation to help Americans who live, work and recreate on our shores to be safe, prosperous and resilient in the face a multitude of challenges.

For the United States to be more responsive to the economic development potential of its coastal resources, improve coastal resilience, and balance the environmental challenges its coastal communities face, the Sea Grant Association is requesting Federal funding of $80 million in fiscal year 2016 for the research, education, and extension activities that make up the National Sea Grant College Program. This recommended funding level includes $10 million for an enhanced Sea Grant resiliency initiative that is consistent with NOAA's strategic priorities. The level of funding for the Sea Grant program is consistent with guidance provided in a prior report from the Subcommittee on Appropriations regarding strengthening the program and with pending authorization legislation.

What is the importance of the Nation's coastal communities?

Nearly 130 million residents or 40 percent of the population of the United States live in counties immediately on our coastlines. Those coastal counties support 51 million jobs, and over 45 percent of the gross domestic product ($7 trillion dollars) of our Nation. Yet these same counties are highly vulnerable to challenges associated with natural and man-made disasters, changes in the natural resource base and ecosystem, and economic hard times, as we recently have seen with the devastating impacts of Hurricane Sandy in the northeast, the impacts of the BP oil spill in the Gulf of Mexico, depletion of fisheries stocks around the Nation, and growing strain on coastal infrastructure from sea level change. The resilience of our coastal communities, their economies and quality of life of their residents depends on how well prepared they are for these events. This includes how residents are able to prepare as well as where and how critical infrastructure and buildings are constructed in the coastal zone. Resilient communities have prepared residents, businesses and infrastructure that reduce the impacts of a myriad of risks to their lives and property and allow life to return to normal much more quickly than in communities that are not as prepared. They also have living coastal resources such as mangroves, oyster reefs, healthy barrier dunes and salt marshes that buffer waves and protect the shoreline from erosion during storms. Only through knowledge, understanding and preparation will coastal communities be able to prepare for and respond to the hazards that are uniquely concentrated in these coastal counties.

How has the National Sea Grant College Program contributed to the economic health of the Nation's coastal communities in the past?

In 2014, the Sea Grant program delivered the following benefits to the Nation as a result of its activities:

—$450 million in economic development;
—6,500 businesses created or retained;
—17,500 jobs created or retained;
—290,000 volunteer hours for outreach;
—760 undergraduate students supported;
—980 graduate students supported;
—53,000 stakeholders modify practices based on information and technical assistance provided by Sea Grant;
—220 communities implement new sustainable practices; and
—21,700 acres of ecosystems restored.

What will the additional $10 million Sea Grant Community Resilience initiative accomplish?

Sea Grant has developed signature programs that have helped coastal communities across the Nation understand their risks, and respond to unexpected changes that affect their livelihoods. Sea Grant has developed locally relevant solutions that will increase community resilience. In some areas of the country, Sea Grant has implemented community resilience programs at a regional level, such as in the Gulf of Mexico, the Northeast and the Great Lakes.

In other areas, programs have been developed at the State level, that have great potential to be rolled out nation-wide, yet this has not been fully realized due to a lack of resources. With the resources requested Sea Grant can:

—Invest in research and unlock data and information to better understand the projected impacts of severe weather and other ecosystem changes and how we can better prepare our communities and infrastructure;
—Help communities plan and prepare for the impacts of severe weather and encourage locally relevant measures that reduce future risks;
—Work with communities that have experienced unexpected events that have impacted their economy with programs such as job retraining or helping to develop new commercial infrastructure; and
—Support science and engineering research that produces breakthrough technologies that increase the resilience of infrastructure to coastal hazards.

What is Sea Grant's role in STEM Education?

Sea Grant program provides an important mechanism that delivers high quality, stimulating STEM education to students using the oceans and coasts or the Great Lakes, as the vehicle for conveying important scientific and natural resource concepts. The support that Sea Grant provides is an important catalyst and helps create important educational partnerships in coastal communities. STEM education is mandated in the legislation Congress passed when it created Sea Grant and that mandate has been reaffirmed through subsequent funding legislation.

SGA recognizes that the Nation is facing very tight fiscal constraints and suggests that where we have discretion, Federal funding ought to go to those programs that deliver economic, environmental, and education benefits to our citizens. The Sea Grant education programs do just that in a very cost effective manner. For that reason and because of the importance of the National Sea Grant College Program STEM education, and the role that it plays in the long term health of our State, we urge the subcommittee to continue to strongly oppose the elimination of Sea Grant STEM activities in the fiscal year 2016 Commerce, Justice and Science appropriations bill.

How does the Sea Grant program make a difference?

Approximately 95 percent of the Federal funding provided to Sea Grant leaves Washington and goes to the State programs where it is used to conduct research, carry out extension and outreach activities, and deliver valuable services to the Nation. Moreover, Federal funding through the Sea Grant program has a significant leveraging impact with every two Federal dollars invested attracting at least an additional dollar in non-Federal resources in mandatory matching funding. The National Sea Grant College Program is one of the very few nationally competitive grant programs that can demonstrate this kind of real impact at the local, State, and national levels.

Since its creation in 1966, the National Sea Grant College Program has been at the forefront of addressing economic opportunities and environmental issues facing coastal communities through its research and outreach efforts. Sea Grant is user-driven and university-based, and it is fully and actively engaged with regional, State, and local organizations. Sea Grant helps America use its coastal resources wisely in order to sustain the health and productivity of coastal communities.

With the $80 million in Federal funding, Sea Grant will leverage an additional $40 million to $80 million in State and local support, continue to increase the economic development and resiliency of our coastal communities, contribute to STEM education in our communities, and help sustain the health and productivity of the ecosystems on which they depend. The Sea Grant Association is grateful to the subcommittee for the opportunity to provide this information.

PREPARED STATEMENT OF SYRACUSE UNIVERSITY, DEPARTMENT OF CHEMISTRY

I am writing to you to with the strongest possible support for the National Institute of Standards and Technology (NIST) center for Neutron Research (NCNR). The NCNR serves a key role in the education of chemistry, physics, materials science and engineering graduate students in a field that is crucial to materials science and engineering. This increasingly includes biomedical areas. There is a chronic shortage of expertise in the area of neutron science in the United States due to very long term lack of major funding dating back to at least the 1970's. The recent successful completion of the Spallation Neutron Source (SNS) at Oak Ridge National Laboratory (ORNL) goes a long way to providing a neutron facility that restores the United States to the first place in facility capability , superseding the ISIS facility in the U.K. A visit to SNS and a tour of the facility floor would immediately show that it is highly populated by persons from Europe. Europe has long held the premier position in this field and will regain this again with completion of the European Spallation Source (ESS) which is under construction in southwestern Sweden (http://europeanspallationsource.se/ess-and-skanska-sign-contract-first-phase-construction).

The NCNR has a wide variety of instrument types (http://www.ncnr.nist.gov/instruments/) providing leadership in novel instrument design and a very broad range of applications. The location of the NCNR in a major metropolitan area with ease of access from a large population center makes it an obvious choice for educational projects. I have had personal experience with this educational aspect of neutron research over a 15 year period. Over this period I was involved in dozens of trips with students, including graduate and undergraduate students from Syracuse University and others involved in summer undergraduate research. Many of these students now work in the neutron field. One of the undergraduates from SUNY Oswego switched his major to nuclear engineering and is now employed in that field. The broad range of instruments at NCNR provides an educational experience that is unique in terms of its broadening of a student's background beyond the text books into many fields.

Neutrons provide a view of materials at the atomic level that is not possible with electromagnetic radiation. This due to several factors including the ability of neutrons to penetrate optically opaque materials, the strong variation of neutron scattering with nuclear isotope (H is different from D) and the fact that neutrons with

thermal energy, and thus by definition with energy corresponding to molecular excitations, have wavelengths that are comparable to molecular sizes. This makes neutrons broadly applicable throughout engineering, manufacturing and medicine as well as basic materials science. Closure of NCNR at NIST could very well result in European dominance of this field in the very near future due to lack of a trained work force and thus threaten our economic independence.

Sincerely,

BRUCE S. HUDSON,
Professor, Chemistry, Syracuse University.

PREPARED STATEMENT OF THE UNITED STATES SECTION OF THE PACIFIC SALMON COMMISSION

Mr. Chairman, and honorable members of the subcommittee, I am W. Ron Allen, the tribal commissioner and chair for the U.S. Section of the Pacific Salmon Commission (PSC). I am also tribal chairman/CEO of the Jamestown S'Klallam Tribe located on the northern Olympic Peninsula of Washington State in Sequim. The U.S .Section prepares an annual budget for implementation of the Pacific Salmon Treaty.

Department of Commerce funding in support of implementing the Pacific Salmon Treaty is part of the Salmon Management Activities account in the National Marine Fisheries Service (NMFS) budget. Funding in the Department of Commerce budget are intended for the programs to fulfill national commitments created by the treaty was $11,181,426 in the 2014 budget. The U.S. Section estimates that a budget of $14,100,000 for fiscal year 2016 is needed to fully implement national commitments created by the treaty.

The implementation of the treaty is funded through the Departments of Commerce, Interior and State. The Department of Commerce principally funds programs conducted by the States of Washington, Oregon, Idaho and Alaska and the National Marine Fisheries Service. The costs of the programs conducted by the States to fulfill national commitments created by the treaty are substantially greater than the funding provided in the NMFS budget in past years. Consequently the States have supplemented the Federal treaty appropriations from other sources including State general funds.

The Pacific Salmon Treaty line Item of the National Marine Fisheries Service budget funded at $4,683,065 for fiscal year 2014 provides base support for the States of Alaska, Washington, Oregon, and Idaho and the National Marine Fisheries Service to conduct the salmon stock assessment and fishery management programs required to implement the treaty's conservation and allocation provisions for coho, sockeye, Chinook, chum, and pink salmon fisheries. Effective, science-based implementation of negotiated salmon fishing arrangements and abundance-based management approaches for Chinook, southern coho, Northern Boundary and Transboundary River salmon fisheries includes efforts such as increased annual tagging and tag recovery operations, harvest monitoring, genetic stock identification and other emerging stock identification techniques. The U.S. Section identified a need of $8,864,303 for fiscal year 2016 to fully carry out these activities.

The Chinook Salmon Agreement line item in Salmon Management Activities funded at $1,601,697 in fiscal year 2014 represents a reduction of $235,000 for previous levels. This funding supports research and stock assessment necessary to acquire and analyze the technical information needed to fully implement the abundance-based Chinook salmon management program provided for by the treaty. The States of Alaska, Washington, Oregon, and Idaho, and the 24 treaty tribes conduct projects selected in a rigorous competitive process.

The International Fisheries Commissions line, under Regional Councils and Fisheries Commissions in the NMFS budget funded at $358,879 and provides the U.S. contribution to bilateral cooperative salmon enhancement on the transboundary river systems which rise in Canada and flow to the sea through Southeast Alaska. This project was established in 1988 to meet U.S. obligations specified in the treaty and had been previously funded at $400,000 annually.

The 2008 Agreement line supports programs for coded wire tag improvements and Puget Sound critical chinook stocks necessary to reach the agreement on revised fishery provisions between the U.S. and Canada. The level of funding needed for 2008 Agreement programs was $3,000,000 and the amount appropriated for fiscal year 2014 was $2,828,646. The U.S. Commissioners view continued funding of these programs in the fiscal year 2016 Federal budget as necessary to address Chinook salmon conservation needs and to meet existing treaty commitments.

The core treaty implementation projects included in the Pacific Salmon Treaty line, and the U.S. Chinook Agreement line under Salmon Management Activities as well as the International Fisheries Commission line under Regional Councils and Fisheries Commissions consist of a wide range of stock assessment, fishery monitoring, and technical support activities for all five species of Pacific salmon in the fisheries and rivers between Cape Suckling in Alaska to Cape Falcon in Oregon. The States of Alaska, Washington, Oregon, Idaho, and the National Marine Fisheries Service (NMFS) conduct a wide range of programs for salmon stock abundance assessment, escapement enumeration, stock distribution, and fishery catch and effort information. The information is used to establish fishing seasons, harvest levels, and accountability to the provisions of treaty fishing regimes.

Like many other programs, funding to implement the Pacific Salmon Treaty decreased in recent years. Prior to that, the base annual treaty implementation funding remained essentially flat since the inception of the treaty in 1985. In order to continue to fulfill the Federal commitments created by the treaty, as costs and complexity increased over time, the States had to augment Federal funding with other Federal and State resources. However, alternative sources of funding have seen reductions or in some cases have been eliminated.

In addition to the recent budget reductions due to sequestration, NOAA changed the way administrative fees applied to the funding to implement the Pacific Salmon Treaty. Last year NOAA decided to apply an administrative fee to the treaty funding, after years of not charging administrative fees to this account. Administrative fees are applied at Commerce headquarters, National Marine Fisheries headquarters and at the regional levels. The result is less funding available for the activities to implement the treaty. While the U.S. Section understands the need for offices in the Department of Commerce to have appropriate funding for administrative activities, the change in the way administrative fees are applied compromises the efforts to successfully implement the treaty.

The provisions of five annex chapters to the treaty expire on December 31, 2018. These chapters contain the specifics for implementing the treaty for each species in each geographic area. The renegotiation for revised annex chapters is underway. In order to ensure that the renegotiations are successfully completed, the programs in the National Marine Fisheries Service contained within the Salmon Management Activities account must be adequately funded. The consequences of not successfully completing the renegotiations will be increased to the health of the fish populations and the fisheries that depend on them.

This concludes the statement of the U.S. Section of the Pacific Salmon Commission submitted for consideration by your committee. We wish to thank the subcommittee for the support given us to us in the past. Please let us know if we can supply additional information or respond to any questions the subcommittee members may have.

Thank you.

PREPARED STATEMENT OF THE UNIVERSITY CORPORATION FOR ATMOSPHERIC RESEARCH

On behalf of the University Corporation for Atmospheric Research (UCAR), I am pleased to submit this testimony to the Senate Appropriations Subcommittee on Commerce, Justice, Science and Related Agencies. UCAR is a consortium of over 100 research institutions, including 77 doctoral degree granting universities, which manages and operates the National Center for Atmospheric Research (NCAR) on behalf of the National Science Foundation (NSF).

I urge the subcommittee to provide the maximum amount of support possible for the vital research and education programs administered by the NSF, the National Aeronautics and Space Administration (NASA), and the National Oceanic and Atmospheric Administration (NOAA) in fiscal year 2016. These essential research agencies fund atmospheric and fundamental science in hundreds of universities across the country, benefitting from the knowledge, expertise and innovation of our academic institutions. UCAR is proud to collaborate with and enhance the capabilities of this unparalleled American resource and it is our honor to be able to draw attention to the excellent atmospheric research that is done on campuses across the United States.

UCAR has worked tirelessly to elevate the understanding of, and support for, the atmospheric sciences nationwide. The atmospheric science departments at our 105 member institutions are drivers of innovation and the fundamental scientific research that has pushed our understanding of weather, climate, space weather, atmosphere, and their interplay, into exciting and groundbreaking new areas. These

advances have improved our ability to predict and understand some of the most dangerous phenomena that occur on our planet every day. Protection of life and property are the central drivers of this scientific innovation and discovery. However, more broadly, these innovations play a significant role in protecting our national security, our homeland, our businesses, our infrastructure and most importantly, our families and communities. As demand for information, prediction, and mitigation increase nationally and across the globe, it is the collaborative and exhaustive research being conducted in our universities and research laboratories that will answer this call and make our families, communities, businesses, and infrastructure better equipped and prepared to meet the challenges and dangers of living inside Earth's dynamic atmosphere.

The challenges we face as we attempt to better understand our planet could not be faced without the strong support of the U.S. Congress, in particular this subcommittee, and the critical research agencies you fund each year. The economic impact of any single investigator's research is often difficult to quantify, however we know that investments in research and development (R&D) taken as a whole have an extremely high rate of return on investment. Economists studying the link between science funding and economic growth have found that innovation through R&D is the primary driver of growth over the long run. Nobel Prize winning MIT economist Robert Solow famously found that over half of increases in economic productivity can be attributed to new innovations and technologies. Another similar study that attempted to quantify the impact of R&D on economic growth found that increases in the level of research intensity in the United States and four other developed countries may have accounted for close to 50 percent of U.S. economic growth between 1950 and 1993.

The return on investments in the atmospheric sciences exemplifies how Federal R&D drives economic growth. The commercial weather industry leverages U.S. investments in weather observation, atmospheric research, and computer modeling to produce tailored products for a wide variety of clients, including the general public. There are now more than 350 commercial weather companies in the United States, generating nearly $3 billion in annual revenues. The growth rate of this industry is estimated to be about 10 percent per year. The vast majority of these innovations and technological advances are products of our academic institutions. Researchers, graduate students, and investigators at our universities are an astounding and innovative resource that, in light of the linkage between innovation and our economy, should be seen for what they are—our most valuable national asset. Across the country there is groundbreaking atmospheric science being done that will power our economy, save lives, protect our citizens, and impact every single American in a profound way.

Innovations don't occur in a vacuum and the U.S. Congress has long recognized and supported the symbiotic and intertwined relationship between the academic, public, and private sectors with respect to research that drives advancement. Progress made in the atmospheric sciences is a reflection of this beneficial relationship and our Federal investments. UCAR actively facilitates and initiates partnerships between these sectors. For example, the development of new weather satellite technology in the COSMIC program. COSMIC is collaboration between UCAR, NASA, NSF, the U.S. Air Force (USAF), and the Government of Taiwan. COSMIC's micro satellites harness existing GPS satellite assets to provide atmospheric readings at a fraction of the cost of the much larger weather satellite programs, while providing greater resolution for our weather prediction models. This data can mitigate any potential weather data gap and will feed the current and future forecast models while greatly improving our ability to predict severe weather and track hurricanes. The research underpinning these advancements was done at Utah State University.

Multipurpose Phase Array Radar (MPAR) is the future of ground based aviation radar and has very promising weather radar applications. MPAR will advance our real-time radar imagery and forecast ability well beyond the current Doppler radar platforms that we rely on every day. MPAR is being developed and tested for this application at NOAA's National Weather Radar Testbed (NWRT) based at the University of Oklahoma. This collaborative effort also involves the Massachusetts Institute of Technology (MIT) Lincoln Lab, the Federal Aviation Administration (FAA), and NOAA. Additional collaborations between the Georgia Institute of Technology and FAA will help to rapidly advance these applications, allowing for improved sever weather forecasting, including advances in tornado prediction and warning systems, which will save lives immediately.

Researchers at Rice University using a computer code, known as the Rice Convection Model, successfully simulated an important class of aurora called "growth phase arcs," which occur when solar wind interacts with the Earth's magnetosphere. Un-

derstanding the dynamics of Sun-Earth interactions are important aspects for improving our ability to comprehend and predict effects of space weather on Earth. These aurora events have enormous potential economic and national security impacts as they have the potential to destroy electrical grids, satellites, and the complex electrical and communications systems that we rely on in nearly every aspect of our lives.

It has been shown that weather variability can cost the United States as much as 3 percent of our annual GDP, and risks lives both in the United States and globally. At Texas A&M, atmospheric scientists are expanding our understanding of how past climate regimes influenced weather. This knowledge will allow decision makers and emergency managers to be better prepared for and therefore potentially mitigate some of the risk and costs of extreme events. Another atmospheric scientist at Texas A&M, is using computer models to study how hurricanes behave in different climate conditions. This work will improve predictions about hurricane season strength and storm numbers. A Texas A&M professor and his research group are also working with scientists at the Naval Research Lab (NRL) to improve weather forecasting models by developing techniques that make better use of atmospheric observations, ultimately improving the forecasts our citizens, businesses, and military personnel rely on every day.

Researchers associated with the National Drought Mitigation Center (NDMC), located at the University of Nebraska, Lincoln, are leading a 4-year NASA-funded project to develop the Quick Drought Response Index, or "QuickDRI." QuickDRI compliments the currently operational "VegDRI," which detects drought's effects on vegetation at time intervals of a month or less. The two programs will be used by the agriculture industry and farmers as tools to detect fast-onset or "flash" drought. This collaboration includes input and support from the University of Maryland, the U.S. Department of Agriculture, the U.S. Geological Survey (USGS), the High Plains Regional Climate Center (HPRCC), and NASA's Goddard Space Flight Center. These models will cover the entire mainland U.S. and be a valuable tool in future drought prediction and mitigation.

The NCAR-Wyoming Supercomputing Center (NWSC) provides advanced computing services to scientists studying a broad range of disciplines, including weather, climate, oceanography, air pollution, space weather, computational science, energy production, and carbon sequestration. The supercomputer is a national resource located in Cheyenne, Wyoming. Using this tool, University of Wyoming (UW) researchers are working on a NSF funded project in collaboration with Brigham Young University, Utah University, and Utah State University that is producing a comprehensive model of the upper Colorado River Basin. This model will be 100 times higher resolution than is currently available and it will play a vital role in policy and management decisions regarding the basin's water—water that supports over 30 million people in North America.

The NWSC is also used by UW researchers in a Department of Energy (DOE) funded project that is creating a computational platform to simulate (including effects of complex terrain) an entire windfarm installation of 100 turbines or more. This model will to improve wind farm siting decisions and wind turbine designs. With NASA support, UW is also developing algorithms, which incorporate geographic and weather profiles, to more efficiently design wind turbines and arrays. These technologies will maximize design efficiency and allow private power companies and their consumers to reap the cost savings from cheaper energy production.

Scientists from Scripps Institution of Oceanography at UC San Diego, NOAA, DOE, NASA, the California Department of Water Resources and other agencies are studying the phenomena of "atmospheric rivers." These "rivers" of clouds flow through the sky and can contain water vapor in excess of 10 times the flow of the lower Mississippi River. Researchers are trying to better understand the role atmospheric rivers play in drought ending precipitation events and how the composition of aerosols, which can be natural or man-made, influence the amount of rain and snow that these clouds release. This research will lead to improved forecasting that can help water managers in California and other drought afflicted States plan for precipitation events that can cause damaging floods and potentially refill reservoirs.

The University of Alabama, Huntsville (UAH) and the NASA Marshall Space Flight Center (MSFC) have entered into a partnership to form the Global Hydrology and Climate Center (GHCC). The GHCC "Lightning Team" has been investigating the causes and effects of lightning as well as analyzing a wide variety of atmospheric measurements related to thunderstorms. The primary objective of this research group is to determine the relationship between the electrical characteristics of storms and precipitation, convection, and severe weather. In order to achieve this objective, the GHCC Lightning Team has designed, constructed and deployed numerous types of ground based, airborne, and space based sensors used to detect

lightning and characterize the electrical behavior of thunderstorms. Understanding of the science that occurs in thunderstorms and lightning storms will improve our ability to predict, prepare for, and perhaps prevent the causes of lightning strikes; potentially saving lives and protecting property.

Members of the subcommittee I offer these examples not only to highlight the extraordinary work done by UCAR's member institutions but also to illustrate the fundamental role that this subcommittee plays in providing the resources that enable our most valuable national asset, our university researchers, to answer our most pressing and important questions. As Edward Teller, American physicist and member of the Manhattan Project said, "The science of today is the technology of tomorrow." With this in mind, I again urge you on behalf of our member universities, scientists, students, and all those that rely on the products and ideas born from the investments that this subcommittee makes in our scientific communities, to continue to recognize the value and return on investment that scientific R&D has provided, and will continue to provide, this great country.